

# **APPENDIX I. SUMMARIES OF TECHNICAL SUPPORT GROUP MEETINGS, LOCAL SUPPORT GROUP MEETINGS, AND POLICY FOCUS GROUP MEETINGS**

## **LIST OF MEETINGS**

This appendix includes notes from the meetings listed below.

### **TECHNICAL SUPPORT GROUP MEETINGS**

- February 23, 1998** Ecosystem Restoration Working Group Meeting, Sacramento River Watershed
- February 24, 1998** Ecosystem Restoration Working Group Meeting, San Joaquin River Watershed
- February 26, 1998** Discussion of Potential Flood Reduction Measures in the Sacramento Valley
- February 27, 1998** Discussion of Potential Flood Reduction Measures in the San Joaquin Valley
- March 16, 1998** Joint Technical Support Group Meeting, Ecosystem Restoration and Flood Damage Reduction, Sacramento River Watershed
- March 18, 1998** Joint Technical Support Group Meeting, Ecosystem Restoration and Flood Damage Reduction, San Joaquin River Watershed
- April 2, 1998** Joint Technical Support Group Meeting, Ecosystem Restoration and Flood Damage Reduction, Sacramento River Watershed
- April 1, 1998** Joint Technical Support Group Meeting, Ecosystem Restoration and Flood Damage Reduction, San Joaquin River Watershed
- May 19, 1998** Joint Technical Support Group Meeting, Flood Damage Reduction and Ecosystem Restoration, Sacramento River and San Joaquin River Watersheds

### **POLICY FOCUS GROUP MEETINGS**

- June 30, 1998** Policy Focus Group Meeting
- August 18, 1998** Policy Focus Group Meeting, Ecosystem Restoration, Flood Damage Reduction, and the Regulatory Process
- September 2, 1998** Policy Focus Group Meeting, Flood Risk and Hydraulic Effects
- October 29, 1998** Corps and State Planning/Project Development Processes (Including NED) Working Group Meeting

## **LOCAL SUPPORT GROUP MEETINGS**

*Note: Summaries of the meetings are included in this appendix.*

|                          |   |
|--------------------------|---|
| <b>November 5, 1998</b>  | Local Support Group Meeting, Fresno               |
| <b>November 6, 1998</b>  | Local Support Group Meeting, Merced               |
| <b>November 6, 1998</b>  | Local Support Group Meeting, Modesto              |
| <b>November 10, 1998</b> | Local Support Group Meeting, Sacramento           |
| <b>November 10, 1998</b> | Local Support Group Meeting, Knights Landing      |
| <b>November 12, 1998</b> | Local Support Group Meeting, Colusa               |
| <b>November 12, 1998</b> | Local Support Group Meeting, Marysville           |
| <b>November 16, 1998</b> | Local Support Group Meeting, Red Bluff            |
| <b>November 16, 1998</b> | Local Support Group Meeting, Willows              |
| <b>December 1, 1998</b>  | Local Support Group Meeting, Chico                |
| <b>February 4, 1999</b>  | Environmental Water Caucus Meeting, San Francisco |

**SACRAMENTO AND SAN JOAQUIN RIVERS COMPREHENSIVE STUDY  
ECOSYSTEM RESTORATION WORKING GROUP MEETING**

**Sacramento River Watershed  
Meeting Report No. 1**

**MEETING DATE:** February 23, 1998

**LOCATION:** U.S. Army Corps of Engineers  
Sacramento District Office  
Sacramento, CA

**SUMMARY OF MEETING**

A brief project description was presented. It was explained that legislation for the project was approved in late fall 1997 and that the project has a four-year timeline, but a major milestone in 18 months (April 1999). At that time, an Interim Report must be made to Congress outlining project progress, future goals, and focus. This timeline will provide an important role in the scope of work for the next year regarding data collection, data analysis, mapping, modeling, public involvement, policy, and project design.

Several issues were discussed during the meeting. This report provides a summary of these issues in synopsis form, rather than chronologically as they occurred during the meeting.

During the meeting, the following list was developed of problems and opportunities, as well as a list of project data sources and data gaps.

**Problems and Opportunities**

- Fish Passage
- Reservoir release schedules
- Capacity of flood control/management system
  - Basin utilization
  - Flood Conveyance
- Lack of enforcement and adjustment of operations and maintenance requirements
- Lack of consistency in managing elements of the flood management system
- Lack of communication among system managers, reservoir operators, local leaders, Federal experts
- Lack of system goals and objectives; "lack of vision" (insufficient foresight)
- Insufficient authority and leadership to manage the flood management system

- Conceptual ecosystem model not yet developed
- Lack of education and agreement regarding what is “restoration”
  - geographic scope
  - objectives
  - what defines “success”
- Expansion of range by exotic vegetative species
- Increase of habitat may result in increases of special status species on adjacent lands which could leave adjacent land users liable for impacts to these species.

## **Data Issues**

### Data Sources

CALFED-ERPP  
SB 1086  
UC Davis  
-1904 Soil Surveys  
State Engineer Maps  
-prior to State/Federal  
flood control/management

### Data Gaps

Gap analysis on landscape ecology  
Sediment transport model  
Baseline analysis of historic landscape/habitat/  
hydrologic conditions  
Patterns of landscape/hydrologic change  
Annual hydrology (2-, 5-, 10-year events)  
Prediction of extreme hydrology through consideration of  
paleogeology  
Evaluation criteria of environmental values versus flood  
protection values  
Detailed topography mapping

## **Project Scope**

Discussion ensued regarding the geographic scope of the Comprehensive Study. Questions were asked about the cut-off line of the project boundaries. The Delta will not be fully considered because CALFED is studying the area. Conversely, CALFED will not address issues far upstream in the Sacramento River watershed.

Discussion involved researching the original flood control systems to develop project boundaries (e.g., where did natural levees begin, where did meander belt begin). There was agreement that historic maps will be extremely useful to accomplish this task. Several participants stated they have access to a full range of historic data dating back to the late 1800's and early 1900's.

General agreement was made regarding a proposed idea that subareas should be developed for the study, and that guiding principles should be established for each subarea, and that these principles may be different for each subarea. The group was reminded that proposals need to be specific enough to receive continued support from Congress after April 1999. Discussion followed regarding Sacramento River reaches that have already been identified through the

CALFED ERPP process that can be used as a starting point to identify these subareas. Work accomplished under SB 1086 was discussed. A proposal was made that the scope should be narrowed to avoid areas that have already been, or are presently being, studied through different programs.

Final scope discussion took place regarding the multiple objectives of this comprehensive study. The group debated whether the study should have a goal of achieving cumulative (but potentially geographically separate) success in flood damage reduction and ecosystem restoration throughout the entire study area, or attempt integrated success where the two main goals are achieved together in the study area.

### **Data Collection and Analysis**

Participants agreed that a gap analysis should be done to look at landscape ecology and to determine remnant pieces of the pre-flood control watershed. Discussion ensued about the study by Steve Greco at the University of California at Davis. This study used 1904 soils maps to develop GIS mapping for pre-system conditions. Concerns were raised that future restoration decisions should be made in areas that are historically worth restoring.

Discussion took place regarding the locations of diversion points and the role the levees play on those diversions and their users. These conditions need to be identified and accommodated. It was also pointed out that annual flow changes are key to the establishment, viability, and stability of riparian habitat and that it would be helpful to get a better understanding of 2-, 5-, and 10-year flows.

### **Hydrology and Hydraulics (H&H)**

Statements indicated that H&H studies need to be designed so that ecosystem restoration data can be input at a later date to accommodate proposed designs and locations. Participants agreed that the Sacramento River and flood basins are already at-capacity and that there is no room for additional roughness from introduced habitat. Concerns were raised regarding how restoration will occur in a system that is at-capacity. Discussion ensued about challenges encountered by entities pursuing restoration with regards to flood capacity analysis. Costly two-dimensional modeling has been necessary in past studies to prove that incremental rises will not occur in flood management systems. Participants agreed it would be better to develop a system that provided very large capacity gains which would then allow some of that gain to be used for ecosystem restoration.

However, the group pointed out an inherent problem in that proposal because it is believed that once large capacity gains are developed, political and water management decision makers will determine that all the gains should be dedicated for future flood protection in the event of an emergency.

Discussion took place about the methods used by the Corps to conduct modeling. The concern is that modeling has always occurred on a linear forecast approach, with the assumption that future floods will supersede even a flood of record. The group discussed the work being conducted by the Bureau of Reclamation paleogeology team. Geologic evidence of the size and limits of ancestral floods in the region are considered in their study. A statement was made that an event that seems extreme now may in fact be the upper limit of size that has historically occurred.

Additional questions about modeling were raised regarding scope and specificity of efforts. The group discussed if it was best to model the entire system or to do extensive modeling of specific locations, once they have been determined through preliminary study activities. It was proposed that “pilot” studies rather than full scale analysis can be done to test the models and assumptions.

Discussion took place about the use of flood easements and structural changes (such as weirs, spillways) to accommodate flood flows into agricultural land and lessen the pressure on levees.

### **Public Involvement and Policy**

Participants discussed how to compare flood protection values with environmental values. A point was made that the issue of flood management for public safety supersedes that of ecosystem restoration. It was suggested that as part of a public involvement program for the Comprehensive Study, polling should be done to determine opinions and awareness of subarea constituents.

Discussion followed about development by local municipalities and counties within floodplains and floodways. It was expressed that these entities are not using expertise and existing information developed by the Corps and State to make sound flood management decisions. Local groups may be concerned about their autonomy vis-a-vis the mandating of land use restrictions by the State of California and the Corps. The group agreed there is a general lack of enforcement in this area.

The group concurred that topics discussed were policy concerns and that the biological/ecological analysis and ideas are as valuable as the institutional setting that allows for their implementation.

### **Resource Management**

It was suggested that reservoir management has stabilized release flows to the extent that they do not support the establishment of natural vegetation (and habitat) conditions. It was suggested that an improvement in this area would be operational changes in reservoir management that allow for more variability in flows both in volume and season. One inherent problem with this measure is water costs.

The major problem of exotic species was discussed. Flow capacity and sediment catchment are affected, and deflected flows cause bank erosion. impacting flow capacity, sediment catchment, and causing erosion by deflecting flows. The Corps has an existing proposal to the State which, if enacted, could provide an 1135 Continuing Authorities Program project on exotic species management.

General concerns were raised that a greater understanding is required about the needs of individual species that have adapted to a dynamic system. This knowledge would help the Comprehensive Study Group to determine where restoration should and should not take place to best enhance these species populations.





**SACRAMENTO AND SAN JOAQUIN RIVERS COMPREHENSIVE STUDY  
ECOSYSTEM RESTORATION WORKING GROUP MEETING**

**San Joaquin River Watershed  
Meeting Report No. 1**

**MEETING DATE:** February 24, 1998

**LOCATION:** U.S. Army Corps of Engineers  
Sacramento District Office  
Sacramento, CA

**SUMMARY OF MEETING**

Several issues and ideas were discussed during the meeting; this report provides a summary of their discussion.

**Geographic Scope of the Plan**

The meeting opened with a discussion of the geographic scope of the Comprehensive Study. The point was made that the San Joaquin River watershed is more easily defined geographically than is the Sacramento. To the east and west, the reservoirs and tributaries to the main stem of the San Joaquin would define the plan area. The west-side tributaries do not drive high stages on the San Joaquin River, but there may be restoration potential in these areas. Other projects are already addressing flood issues in the Tulare Lake basin area. Therefore, this basin should be treated as a separate basin; however, the study plan may have to address issues regarding water exports from the Tulare Lake basin to other basins. The study plan should be compatible with CALFED in the area of the Delta. In terms of hydrology/hydraulics, Vernalis may be the logical northern boundary of the plan area; beyond this point, the San Joaquin River is tidally influenced.

**Other Relevant Studies**

It was noted that Jones & Stokes Associates is currently conducting three projects for the U.S. Bureau of Reclamation on the San Joaquin River. This work will provide relevant background for the Comprehensive Study plan. Two projects - an analysis of the physical process affecting the San Joaquin River, and mapping of historical and existing riparian vegetation - cover the 150-mile stretch from Friant Dam to the confluence with the Merced River. The third project is a riparian restoration and parkway plan for the 12-mile stretch of the river between Mendota Dam and the City of Firebaugh.

## **Contrasts Between the Sacramento and the San Joaquin River Watersheds**

It was pointed out that the Sacramento and the San Joaquin Rivers have their own specific issues. The differences between the two watersheds were described. The Sacramento River has much larger flows, whereas in the San Joaquin, peak flows are mostly captured in reservoirs. The size of the San Joaquin River corridor has been reduced much more than the Sacramento, as a result of early land reclamation and altered hydrology.

## **Restoring Flood Flows versus Water Supply for Fish**

The group discussed that the Comprehensive Study plan should not attempt to address the issue of water supply for fish. It was agreed that this project would not be an appropriate or effective forum for resolving this issue; moreover, the Corps is not authorized to address this issue. However, it was emphasized that flows in terms of restoring seasonal flood flows and enhancing riparian habitat could and should be treated as a separate issue from flows for fish.

## **Sediment Loading**

Sediment loading in both the main stem and the bypasses was identified as an important issue. There is much sand in the system, in the bed of the San Joaquin River and in the active floodplain, that is easily mobilized during high flows. Because of this situation, landforms along the river are relatively unstable. The Comprehensive Study plan will need to address the interactions between protecting and establishing riparian vegetation and sand accumulation. Clearing and snagging is currently up to the local levee districts, which do not treat all areas along the river in the same way. Sand is accumulating in the floodplain because levee districts do not currently have another location for disposal of the sand. Therefore, at high flows, sand is returning to the system. The solution to this problem should include reducing that quantity of the sand, as well as stabilizing the channel, to prevent recurrence of sand sedimentation and further maintenance.

## **Instream Mining Pits**

There was considerable discussion regarding instream mining pits, which occur mostly in tributaries of the San Joaquin River, and their affects on the river ecosystem (e.g. converting cold water riverine habitat to warm water lake habitat). There was agreement that this issue could be addressed by the Comprehensive Study since it has not been comprehensively examined. The Comprehensive Study plan could more definitively identify the problem and propose solutions. Potential solutions for isolating pits from the river would most effectively be addressed through a interdisciplinary approach, including biologists, geomorphologists, and engineers. The first step would be to contact the Division of Mines and Geology about existing documentation regarding the location of the pits and existing problems. Some issues are regulatory, however. The Comprehensive Study plan could focus on how to improve existing pits that are not regulated.

## **Alteration of Levees to Restore the Floodplain**

There was agreement that a major opportunity to achieve multiple benefits related to flood damage reduction and ecosystem restoration along the San Joaquin River arises from altering levees that restrict the area within the active floodplain. The duration - rather than the intensity - of flood flows contributes to the risk of saturation of the levees, and problems associated with seepage. The existing channel should be able to handle a larger range of flows, rather than contain the 100-year event. Possible solutions include restoring out-of-bank flows by completely removing existing levees to create setback levees. Such levees may be less prone to seepage than existing levees. The objective of altering the levees would be to minimize costs in terms of ongoing system maintenance. Although restoring the floodplain is the primary focus, the level of flood protection for major events would need to be addressed, especially in urban areas. Levee districts may be interested in non-structural solutions, but they would need a degree of predictability and the ability to manage floodplain areas.

The study should also address, as part of restoring flows to floodplain areas, the creation of upland cover and refugia for wildlife (e.g., the brush rabbit) during floods. One measure could be the creation of islands from abandoned levees.

Areas that are currently managed for waterfowl, such as the duck clubs in the lower reaches of the San Joaquin River, focus on management of water and inundating areas to attract waterfowl and maintain access roads. Coordination with these entities may be necessary to provide natural cycles of seasonal flooding in these areas.

There was discussion regarding the lack of a mechanism to implement non-structural projects. Non-structural projects require strong coordination with neighbors regarding flood protection, especially of transportation systems. Project neighbors have required hydraulic models with conservative assumptions that provide some level of certainty that infrastructure will not be damaged from out-of-bank flows. Non-structural projects require a project custodian - a local agency that can oversee a project. The question was raised of how to alter a project so that stakeholders for flood management and ecosystem restoration can share in initial project funding.

Non-structural projects on private property must offer landowners measurable benefits (e.g. fixed seepage or drainage problems). Owners must be compensated for future lost opportunities on their land. Landowners are usually more interested in selling their property than in being compensated through floodway easements. Public lands should be identified as the first opportunity for restoring floodplains by altering levees. The optimal opportunities for restoring the floodplain on private lands would be on lands that do not provide prime agriculture. The Comprehensive Study plan should identify these areas.

## **Control of Exotic Species**

The Comprehensive Study plan should address control of exotic species. Arundo is a problem species in the Delta. When levee districts clear vegetation from areas, they are not well informed regarding appropriate treatments for arundo. Recommendations are needed for control of this species. Tamarisk and pampas grass may also be potential problem species.

## **Restoring Seasonal Flood Flows to the Main Stem**

It was noted that in portions of the San Joaquin River more water is diverted to other canal systems than is left to flow in the main stem of the river. The group proposed restoring seasonal flood flows to the main stem of the river. This option could provide opportunities for restoring a continuous corridor of riparian vegetation and result in benefits to water quality by flushing accumulated salts and diluting agricultural drainage.

## **Participation of Stakeholders**

All potential issues were not identified during this meeting; further participation by other stakeholders will be needed. Use of other methods (e.g., E-mail, telephone conferences) may be more effective in receiving input. Such methods may also better provide participants with preliminary lists of issues (based on background documentation [e.g. ERPP, San Joaquin River Management Plan]) and an outline of the Comprehensive Study plan for comment. The study team should show how the Comprehensive Study dovetails with other efforts such as CALFED.

## **More Capacity at Friant Dam for Providing Water for Environmental Purposes**

It was noted that the legislation does not exist to assure that, by developing greater capacity at Friant Dam, water will be dedicated for environmental purposes. The mission of the Comprehensive Study plan is to identify non-structural solutions before considering structural solutions.

## **Criteria for Defining Corridor Width**

There was discussion about the need to establish criteria for defining the maximum and the minimum width of land that is needed to restore the floodplain, especially regarding riparian habitat restoration. It was recognized that, for some species, connectivity is important for movement between habitat nodes. Additionally, neotropical bird nest parasitism is a consideration in defining a minimum width. However, it was also recognized that it is difficult to develop performance standards for ecosystem functions. While some factors are quantifiable, others are more random, and therefore more difficult, to quantify, especially those elements which have not only a physical, but also a temporal scale. In these cases, qualitative descriptions will be needed to describe the dynamic nature of the system.

There was discussion about developing specific criteria for the first phase of the Comprehensive Study plan. It may be advantageous to identify, in more general terms (e.g. without dimensions), all the necessary components for a successful restoration project. For example, the Comprehensive Study plan should define both the structure and process elements (events over time) for achieving high, moderate, or low quality habitat.



## **DISCUSSION OF POTENTIAL FLOOD REDUCTION MEASURES IN THE SACRAMENTO VALLEY**

**Corps of Engineers, Sacramento District**

**February 26, 1998**

### **OVERVIEW OF STUDY**

The Sacramento and San Joaquin River Basins Comprehensive Study will develop an action plan for integrated flood damage reduction and ecosystem restoration in the Sacramento and San Joaquin River basins. The four-year study will be completed in two phases.

Phase I will occur during the first 18 months, and will include the following tasks:

Framework Plan. This report to Congress will describe problems and opportunities, establish planning objectives and criteria, and identify potential structural and non-structural measures that will reduce flood risk and improve ecosystem conditions. The Framework Plan is a system-wide planning study that will describe the measures and how, combined, they could work to meet the study objectives. The Comprehensive Study plan will also describe coordination opportunities with other programs, such as CALFED and CVPIA, and will identify policy and legislative issues that would need to be addressed to facilitate plan implementation. The Framework Plan is scheduled for completion on April 1, 1999.

Post Flood Assessment. This assessment will describe flooding conditions for the 1983, 1986, 1995, and 1997 flood events.

Hydrology/Hydraulic Models. This task develops basin-wide hydrologic models. A series of numerical models will be used, with links to account for runoff information to main channels. A set of hydraulic models will be developed to route flows and calculate velocity. Two sets of models will be developed, one for each basin. The models will run both base (low-flow) and flood-flow simulations. The models will be in place at the end of Phase I.

Phase II will cover the remaining 30 months of the Comprehensive Study period. This phase will include detailed studies with models and the development of environmental documentation.

### **FLOOD FLOWS IN THE SACRAMENTO RIVER BASIN**

Prior to development, flood flows in the Sacramento River overflowed into a series of basins, which would slowly drain back to the river. This process took months in some areas. Low areas in the basins were swamp lands. Consequently, the capacity of the Sacramento River diminishes

in some downstream areas. Above Chico Creek, the Sacramento Valley is relatively narrow, and no basins are present. Below Chico Creek, flood water overflowed into the Butte Basin on the east side of the valley. Further south, the Sutter Basin received overflow from both the Sacramento and Feather Rivers. On the west side, flood water overflowed into the Colusa, American (Natomas), and Yolo Basins. These basins could hold about 2 million acre-feet of water, and attenuate peak flows. Prior to the construction of levees, the Delta was a wetland area.

Early development under the Swamp and Overflow Act partially or totally reclaimed some of these basins, and reduced their storage capacity. The flood control system was designed to use these basins as buffers to continue attenuating peak flows to protect downstream areas.

The Colusa Basin is protected from Sacramento River overflows by levees and a gate structure; this basin does not receive flood overflows until Sacramento River flows exceed 300,000 cfs. The gates are opened for drainage in summer during low flows.

Levees in Butte Basin surround a swamp, and cause flood water to move to the eastern portion of the basin. The current configurations of the Sutter and Yolo Bypasses are close to the original basins.

Butte Basin acts as a buffer for the Sacramento River flows above the Sutter Buttes. Butte Slough, above Sutter Buttes, empties into Sutter Basin. Gates are opened in summer and closed in the winter to divert water to Sutter Bypass. In the lower Sacramento Valley, the largest source of flood water occurs from the Feather, Yuba, Bear, and American Rivers, which do not have similar buffers.

Prior to the construction of levees, the Feather River meandered extensively. The river channel had deep holes and pockets prior to sedimentation from mining operations.

## **SACRAMENTO RIVER BASIN FLOOD MANAGEMENT SYSTEM**

The Sacramento River basin flood management system relies on basins for temporary storage and attenuation of peak flood flows. Water is routed into the basins and by-passes through a series of weirs (Moulton, Colusa, Tisdale, Fremont, Sacramento). Looking downstream, the capacity of the Sacramento River decreases, and the capacity of the bypasses increases.

Moulton and Colusa weirs divert portions of Sacramento River flows into Butte Basin overflow area. At Tisdale weir, the river capacity decreases from 66,000 cfs to 30,000 cfs, with remaining flows diverted into the Sutter Bypass. All three of these weirs are automatic (no operation necessary).



Below Knights Landing, waters converge from Sutter Bypass, Sacramento River and Feather River (including Bear and Yuba River flows). At this point, the Fremont weir controls overflows into the Yolo Bypass. Further downstream, just above the confluence with the American River, the Sacramento weir controls additional flows to the Yolo Bypass.

The Sacramento weir diverts Sacramento River water into the Yolo Bypass when it backs up from American River flows. It was built by the City of Sacramento in 1916 and it is operated manually. The weir was designed to protect against sedimentation, because navigation was an authorized purpose for the river. The Sacramento weir has become antiquated and may even be dangerous. Can the structure be maintained, or can it be altered to a gated or sill-type weir that allows for automatic operation? This problem has been considered for some time, but plans were deferred, awaiting a decision on the Auburn Dam. Suggested changes include releasing more water at lower stages into the Yolo Bypass. This change in the operation of Sacramento weir raises these questions:

- Can operations be altered now that navigation is not an issue? De-authorization by Congress would be needed for this change.
- Is The Reclamation Board authorized to flood the Yolo Bypass lands earlier in the flood year? If the Yolo Bypass floods after flows begin to pass the Fremont weir, it is probably acceptable. If the portion of the bypass below Sacramento Weir floods first, this plan may be problematic.

The Yolo Bypass also intercepts flows of Cache, Willow, Putah, and Ulatis Creeks, and discharges into the Sacramento River in the Delta.

Within the Delta, the Sacramento River picks up flows from the Cosumnes, and Mokelumne Rivers.

The Sacramento River basin system functions adequately. However, the system is not complete and is not operated according to initial design plan. Actual capacities of the river, weirs, and bypasses are unknown. Corps design capacities, based on assumed stage and backwater conditions, do not correspond to reported capacities shown on a system diagram prepared by the Department of Water Resources. In a letter dated 1969 from the Corps to The Reclamation Board, the capacities per Senate Document 23 do not agree with official design capacities per Corps. For example:

- Sutter Bypass, design flows are 150,000 cfs in the upper portion and 180,000 cfs below Tisdale weir. Measurements in these sections are 176,500 cfs in the upper portion and either 211,000 or 216,000 in the lower portion. Which measurement is accurate?

- Tisdale weir design capacity is 38,000 cfs. Hydraulic calculations show that when at capacity and when the Sutter Bypass is full, capacity is 24,000 cfs.
- In the Butte Basin overflow area - Big Chico Creek to Colusa County line (18 river miles) - the Butte Basin overflow plan was based on a 300,000 cfs, 100-year-flow at Stony Creek. One half of this amount must exit to the Butte Basin overflow area, and cannot exceed 160,000 cfs on downstream levees. Such an event has not occurred since 1940, due to the attenuation of peak flood flows by Shasta Dam and reservoir.
- Moulton Weir was designed for 25,000 cfs. If design stage is reached, it may take 35,000 to 40,000 cfs.
- The Colusa Weir design is split into 70,000 cfs into Butte Sink, and 65,000 cfs downstream past the city of Colusa. Colusa weir has always taken more than the design split, which is necessary because Tisdale Weir cannot handle this flow. The levees on the Sacramento River between Colusa and Moulton Weirs are at the greatest risk of overtopping. These levees are in good condition, and well-rocked. From Colusa Bridge upstream, the levees widen and there is more capacity in the river. Downstream, the levees are tight against the river.
- Tisdale Weir has debris-trapping problems. A one-lane bridge over the top of the weir with guard rails) is a major problem. Sutter County plans to change the structure to widen the space between bents, and thus reduce debris trapping, but the flow still will not reach 38,000 cfs. (Colusa, Tisdale and Sacramento Weirs all have bridges over their tops.) Debris moves downstream and catches next to the bridge.
- Similar differences between design and actual capacities occur elsewhere in the river system. Part of the problem may be due to the assumed backwater and freeboard used in design calculations. Sedimentation adds to the discrepancy.

Levees on the Sacramento River are good. Failures have occurred on the Feather River, where levees are made of inadequate material which includes organic matter. Seepage is common on the Feather River levees, and they are saturated..

## **BUTTE BASIN ISSUES**

The Butte Basin overflow is not recognized as part of Sacramento River Flood Control Project. Some water from this area returns to the river, some remains in the basin. The structures were built with minimal engineering. To improve conditions in the Butte Basin, some training levees are needed to drain the water. Existing weirs would need replacement with a structure similar to the Fremont Weir. The State of California built the weirs. The Corps has performed bank protection.

- The system relies on two major oxbows with cutoffs that prevent water from passing over weir structures.
- About one-half of the Sacramento River flow has to enter Butte Basin to protect the remainder of the river.
- The Reclamation Board limits levee height in Butte Basin. Anything above 18 inches requires approval. The Board prescribes elevations to permit major flood flows to get into Butte Basin.
- There are meander cut-off problems. In 1986, Butte Basin overflow plan was devised by the State. The Corps has put in 30,000 lineal feet of bank protection to hold the two meanders. Extensive work has been done on the Murphy Slough Plug which keeps the larger of the oxbows. The water surface difference across Murphy Slough Plug is 5 feet in flood flows. Preventing cut-off causes a higher stage, and a lower flow down the river. Cut-off would reduce stage, and increase velocity. This would result in too much flow down the river.

## **BYPASSES**

The Comprehensive Study will examine the factor of sedimentation in the bypasses in the study area. The following information has been determined thus far:

- There are possibly two to three feet of sedimentation in the Sutter Bypass. The likelihood of increasing the capacity of the bypass, and concomitant measures, are thereby affected.
- Sediment exists below the cobble weir in the Yolo Bypass. This sedimentation could account for a portion of capacity loss.
- The Yolo Bypass stages higher than design flow, but not at design flow. If the levee breaks on the Feather River had not occurred during the floods of 1997, additional flows would have caused record stages at Sacramento.

## **SUGGESTIONS AND COMMENTS TO CONSIDER FOR COMPREHENSIVE PLAN**

- If the flood management system is re-designed, the effects of sea level elevation rise in the Delta must be considered. Backwater conditions reduce flow capacity.
- Flood protection for Sacramento could conflict with flood protection for other cities and towns. The creation of weak spots in levees, designed to fail into overflow areas, could threaten other areas as well.

- The Comprehensive Study will comprise two areas: Sacramento River basin and the San Joaquin River basin. The Delta will be studied by CALFED. This State/Federal group believes that Delta levee improvements are the core element, regardless of alternative. The Corps is engaged in an ongoing program to implement levee improvements. Delta Protection Commission has established objectives for Delta uses.
- The time frame for the Comprehensive Study Interim Report is eighteen months. Policy and legislative changes will not be addressed during this phase, but will undergo consideration at a later stage. The Interim Report will, however, identify issues which could require policy changes for plan implementations.

## **SPIN-OFFS**

- Need specific actions to undertake, rather than complete system.
- Fundamentals of hydrologic and hydraulic model must be understood by all involved parties, but the study group should also take existing base of actions that have a high probability of success. These projects ought to start. The Corps will proceed with two ecosystem restoration actions, one from Chico Landing to Red Bluff, the other is at Woodson Bridge.
- East-side streams have no reservoirs, project levees, or by-passes. These features are used in both the Sacramento and San Joaquin River systems.
- The Corps has numerous standing authorities (S. 205, S. 14, S. 208, S. 1135, S. 206) that could be used to implement specific actions. The Comprehensive Study should identify specific actions that can be funded through these authorities. The current small project authority is a maximum of \$5 million for each project. Possible projects could focus on:
  - Better knowledge of hydraulics, freeboard, backwater, weir capacity, channel capacity;
  - Identified crisis points - priority fixes:
    - Tisdale - bridge; widen weir; widen levees below weir;
    - Hamilton City meander area
  - Monitoring Process for Environmental and Engineering: Geometry for models must be verified. The Corps has completed surveys of much of the Sacramento River system. Levee profiles, bathymetry, terrestrial topography, and bypasses have overlapping cross-sections. Environmental surveys for ESA species are required, and not yet done.

These tasks could be undertaken through the following programs:

- ITF
- FEAT
- AB 360 (Prop 204)
- CALFED
- CEQ/OMB
- SAFCA
- Corps Authorizations

## **FIELD FLOODING PROGRAM SUGGESTED FOR COMPREHENSIVE PLAN**

In 1997, the flood management system failed by gravity in a way that protected Sacramento. Some areas were major problems, but agricultural lands were saved for \$2.7 million by pumping out. Lands were back in full production and agricultural land was saved. Destruction was correctable in a two-to-three-month period.

A structured program could be established to develop easements that would allow flooding of specific lands under high-flow conditions. A structured process with easements, and a 10-year program would provide landowners with greater certainty that the land would be pumped out, or covered by flood insurance if not pumped out. This measure would be a non-structural, reversible program. It may be possible to make land available during a normal flood season, with removable gates. Measures could then be taken for flood protection during the agricultural season. One complication might be reduced crop insurance coverage if the water cannot be pumped out prior to the growing season. The 10-year portion only relates to participation in the California Farm Bureau and changes in crop insurance.

This program would allow an opportunity to develop knowledge and awareness of flood management measures and issues. It could be implemented for a much lower cost than major structural changes. If unsuccessful or problematic, the program could be eliminated.

This program would address flood damage reduction but it may not directly provide ecosystem restoration. Specific permanent projects that allow for vegetation improvement would be needed to assist in that goal.

One of the environmental concerns for such a program is a possible lack of confidence in a 10-year (short-term) program. The program does not provide a long-term commitment for ecosystem restoration.

Specific break areas to consider in such a proposed program are:

- Tisdale to Sutter Bypass (RD 108 and 1500)
- Inundated area of RD 1500

## **SUGGESTED MEASURES**

### **1) INCREASE BUTTE BASIN STORAGE**

Objective - Attenuate peak over longer period of time, and maintain Sacramento River capacity.

Actions - Modify Long Bridge (high flows), and modify flood release structures (M&T, 3B's, Goose Lake).

Benefits - Provide additional storage in basin for flows from east-side streams, thereby delaying inflow to Sacramento River and allowing flows from the Feather and American Rivers to pass through the Sacramento River system.

### **2) INCREASE CONVEYANCE OF TISDALE WEIR**

Objective: increase flow rate over weir, and return to design capacity.

Actions - Replace/modify bridge.

### **3) REMOVE FEATHER RIVER CHOKE POINT AT SUTTER BYPASS**

Some backwater in Feather River below Bear River;

Narrow channel increases velocity, and erosion;

Would widening choke point increase downstream risk?

Solution should focus on reducing velocity.

### **4) INCREASE SUTTER BASIN STORAGE**

Managed, infrequent overflow. RD 1500, at confluence, could be considered overflow area during extreme flooding.

### **5) REDUCE LEVEE MAINTENANCE COSTS - DECREASE LEVEE LENGTH**

Find opportunities to reduce levee maintenance while improving habitat conditions. Examples are levee straightening and set-backs through oxbows. Although this measure would not substantially change the system-wide level of flood protection, it would provide environmental benefits and may reduce local flooding problems.

Set-back far enough to allow geomorphic processes to develop between levees. The extent of set-back depends on the hydraulics of the river.

Historic performance of levees does not provide complete information, because reservoir operations were modified in response to flood events, thereby reducing stress on levees.

### **6) INCREASE CAPACITY OF YOLO BYPASS**

Upstream flows exceed capacity;

Water could reach Delta faster and create levee problems.

This change would need coordination with the American River Project.

### **7) INCREASE UPSTREAM STORAGE ON THE AMERICAN AND YUBA RIVERS**

There are no overflow areas to control American and Yuba River flows before they enter the Sacramento River. These basins are in the Sierra foothills, and they do not provide space on valley floor. The critical problem for the City of Sacramento is a storm centered over Feather,

Yuba, Bear, and American River basins. All of above measures would not resolve this problem. The floods of 1986 and 1997 are examples of this problem.

## **SUMMARY**

### **PROBLEMS**

Design capacity of flood management system compared with actual capacity of systems  
Urban development in floodplains

### **OPPORTUNITIES**

Set-back levees  
Oversized levees  
Planned overtopping/pump-out/crop insurance  
10-year interim field flooding program

### **CONSTRAINTS**

Backwater effects  
Reduce flow capacity  
Inundate existing structures  
Timing of flows





## **DISCUSSION OF POTENTIAL FLOOD REDUCTION MEASURES IN THE SAN JOAQUIN VALLEY**

**Corps of Engineers, Sacramento District**

**February 27, 1998**

### **OVERVIEW OF PROBLEM**

The San Joaquin River system is significantly different than the Sacramento River system, in terms of the natural hydrologic condition, and in terms of modifications made during the past century. Prior to development, the San Joaquin River system was characterized as a high bed load system, subject to major flow variation, frequent channel meandering, and bank overtopping. The system is subject to both rainfall and snowmelt runoff. The development and operation of major dams and reservoirs have modified flow conditions, providing very low flows during summer months.

Riparian habitat in the Sacramento River system is controlled in many areas by the increase in flows due to construction and operation of the projects. In the San Joaquin River system, projects have reduced flow and encouraged riparian vegetation growth.

Sedimentation is a major problem in the San Joaquin River system. The river bottom in the south Delta is eight feet higher than it was in the 1930's

The San Joaquin River is subject to different conditions in three main reaches:

- The Delta to Merced River
- Merced River to Gravelly Ford
- Gravelly Ford to Friant Dam

### **SUMMARY OF ENVIRONMENTAL CONCERNS**

Based on meetings with representatives from environmental resource agencies, the Comprehensive Study Group identified the following issues relevant to the San Joaquin River system:

- Large tracts of land are in public ownership. It may be possible to authorize levee breaches for ecosystem restoration and flood management.
- The Bureau of Reclamation is performing a riparian restoration program above the Merced River.

- There is much information regarding historic riparian areas.
- The San Joaquin River is further removed from its natural state than is the Sacramento River. Ecosystem restoration cannot return the river to pre-development conditions.
- Lack of confidence that any increase in reservoir storage capacity (i.e., Friant Dam) for flood management and ecosystem enhancement would not be re-allocated for water supply or additional flood control space.
- The San Joaquin Valley presents opportunities for flood damage reduction and ecosystem restoration.
- It is difficult to implement non-structural approaches under the PL-99 program. The authorized purpose of PL-99 is to restore levees to pre-flood conditions. The Comprehensive Study Final Report to Congress may express the need for changes in policy and legislation to implement non-structural measures.
- The San Joaquin River basin is in a semi-arid climate.
- Concerns exist about exotic species dominating river system.
- Previous studies have identified some actions that could be environmentally beneficial, but a hydrologic understanding is needed to evaluate these actions in the context of a comprehensive plan.
- Fix the pits left from mining on tributaries to prevent river capture by the pit.

## **PROBLEMS**

### **Channel Capacity**

Limited channel capacity is the most critical flood problem in the San Joaquin Valley. Primary causes are:

- Levees: In many locations, levees are too close together, causing a choke point. Levees overtop when Vernalis is at 30 feet, or 30,000 cfs. This flow is well below design capacity of 52,000 cfs.
- Vegetation: The low flow conditions in the river support shrubs and trees that reduce capacity. Erosion during higher flows undercuts banks, and vegetation falls into the river, further reducing capacity.
- Sediment build-up and island formation.
- Bridges: undersized; create choke points.

### **Facility Size**

- The San Joaquin River system was designed for snow-melt, not rain floods.
- Current hydrologic record differs greatly from the record available when the system was designed.
- Friant Dam and New Don Pedro Dam are undersized, relative to other reservoirs in the river system.

- Need more capacity, volume, and flow, before system can manage a flood of magnitude such as that in 1997.
- The Eastside Bypass is undersized.

### **Maintenance Restrictions**

- Authority
- Funding
- Permits

### **Structural Integrity**

- Many levees downstream of the Merced River are on basin soils rather than mineral soils which are more highly compacted, reducing seepage. Due to chronic seepage in this reach, maintenance costs are excessive..
- River side levee slope is too steep (2:1), and difficult to effectively maintain. Vegetation burns and regrows.
- Seepage on Eastside Bypass observed at 4,000 cfs, within channel capacity.
- Twelve foot levee crowns on San Joaquin levees; this crown width is narrow.

### **Gravel Pits**

- Abandoned gravel pits are along the tributary rivers, primarily on the Tuolumne River, but are not on the mainstem of the San Joaquin River. The pits were constructed with barriers between pits and rivers. These pits change the character of the river, making it more lake-like than riverine. They also provide recreation opportunities.
- Many pits are abandoned and are problems for fish and for public safety. Fish are trapped, and subject to predation. Barriers that separate the pits from the river have fallen. The Reclamation Board has required cuts for downstream flow back to the river.
- The pits provide some local flood storage, but this storage is minor in a regional sense. Turlock Irrigation District is looking at solutions on the Tuolumne River.
- This issue was not considered significant for flood damage reduction measures.

### **Land Use**

- Initial design of the San Joaquin River flood management system has been overreached by recent floods. Restoring the system to initial design capacity may not provide adequate flood protection.
- Maintenance of existing system must coincide with prudent land use choices.
- The Comprehensive Study Final Report to Congress should address residential development behind levees. 100-year flood protection may not be adequate for residential structures behind a levee. Flood insurance may be required in those instances.

- It is impossible to ensure against a levee break or a flood barrier break.

### **Existing Policy**

- Certain regulations prevent or impede maintenance actions for flood management, and can cause conditions to worsen. Dredging may not be permitted in natural stream channels; thus sediment can accumulate and channel capacity will decrease.
- Agency coordination with Section 404 permitting complicates the process. For example, South Delta Water Agency cannot remove sediment in a channel where pumps are located without also adding fish screens to allow continued operation of pumps. This condition was mandated by NMFS.
- Identify which programs would lead to immediate implementation.
- Identify successful projects.
- There is an overall concern among all interested parties that another major flood will occur before a feasible plan can be implemented for flood management.
- If permitted, dredge channel and use the dredged material for land side improvements to widen crown and reduce slope.

### **OBSERVATIONS AND QUESTIONS**

- Determine the overall potential for flood management system, then combine with ecosystem restoration features.
- Start at the bottom of the system and work up. The south Delta must be considered part of the San Joaquin River system. There is no arbitrary distinction between the San Joaquin River and the Delta. Choke points continue to Tracy Blvd. Bridge on Middle River. Downstream effects of actions must be gauged.
- What level of flood can be managed?
- What failure level do we acknowledge in our design? A fail-safe system is impossible to design.
- A General Design Memorandum (GDM) calls for different return periods in design flow for different reaches (averages at 50-year event).
- Design is based on snow-melt floods. In 1997, we had two tributaries with rainfall floods. Assume what would happen if all the rivers have rainfall floods.
- Backwater from Delta contributes to the problem.
- Vernalis design flow is 52,000 cfs, not sustainable above 45,000 cfs.
- Improve maintenance of existing system, and consider improvements.
- Low flows support habitat growth. High flows cause erosion and, in turn, vegetation falls into the river, obstructs flow, causes meanders, and raises water temperatures. When an eroded bank falls into the river, point bars are created to support new habitat. This scenario allows successive re-generation, and spatial diversity in habitat.
- Restoration actions should allow the river to continue its geomorphic process.
- Need a low flow channel with bank protection; avoid blockage.

- Channel clearing may be more acceptable if coordinated with ecosystem restoration.
- Relocation of existing development is impossible, but floodplain management is essential.
- Some levee setbacks make sense, but system-wide wholesale changes do not appear reasonable or cost-effective. Flows will not be available to sustain meanders.
- If ecosystem restoration is considered, pulse flows are needed to move sediment.
- Area with greatest potential is Merced downstream, to a lesser extent from Mendota Pool to Merced. Minimal potential exists south of Tulare ridge.
- Levees are closer together at some locations and they pinch the river system.
- Fix Choke points:
  - Upper and Middle San Joaquin River have brush and trees in channel.
  - Vernalis to Old River sensitive to splits into Paradise Cut, Old River, Middle River.
  - Middle River is a narrow channel. Clean out channel, bamboo, and sediment. Remove brush. Propose modest levee setback, to take chokes out.
  - Improve weir on Paradise Cut, lower and widen. Clean out channel.
- Bleed off peak flows:
  - Allow flood water to flow into existing wetlands. Refuge managers are reluctant because of need to raise duck blinds and Visitor Centers.
  - Examine moderate-sized events for offstream (temporary) storage.

## **H&H MODELING FOR SAN JOAQUIN SYSTEM**

- Hydrologic model will include the entire San Joaquin watershed, with links to Tulare Lake basin. Included will be rainfall runoff from West Side, and reservoir operations, including Pine Flat Dam.
- Hydraulic model includes Paradise Cut and Old River. Downstream boundary is the Stockton Deep Water Ship channel; upstream boundary is Friant Dam. Include rainfall runoff on West Side.
- Include Paradise Cut, Old River down to next connections
- Primary focus is on reservoirs, including Pine Flat.

## **OPPORTUNITIES**

### **Existing Authorizations**

- May be easier to get authorization for restoring design capacities than to upgrade system.

### **Coordination with Other Programs**

- Existing Programs
  - San Joaquin River Management Program
  - Corps Reconnaissance Studies

- Related programs
  - CALFED
  - CVPIA
  - Corps and State Programs

## **Levee Setbacks**

- Setback levees may be appropriate in some areas to reduce choke points.
- A system-wide construction of setback levees would not be cost-effective.
- R. D.'s 2099, 2100, and 2101 are proceeding with levee setback projects. These programs have willing buyers, willing sellers, and funding.
- Land near the river is at a higher elevation than are outer areas due to the depositional process. Setback levees could be extensive in some areas. Potential choices for levee setback are steep areas, with adjacent mineral soils.
- Farming is still possible on river side of levees, with setbacks. Easements are preferable to fee purchase because of riparian rights.

## **Dredging and Sediment Control**

- Estimated annual sediment loads of 100 million tons in a non-flood year, 200 million tons in a flood year. Without some removal process, flow or dredging, sediment accumulates in south Delta.
- The State maintains channels on Sacramento River Flood Control Project but not on the San Joaquin River.
- There is no responsible entity to maintain the river channel between the levees. Reclamation districts have no authority to maintain channel, only levees.
- Previously authorized channel maintenance projects were not cost-effective. Mitigation requirements were high.
- SJRMP identified several points along the river system where sediment could be dredged. One location is Banta Carbona. To date, the project has been stalled due to conflict with the ESA.
- Sediment loads in the Mendota Pool are a problem. Current practice is to pull boards and let sediment sluice downstream. Dredging in the pool is prevented by environmental concerns. Sediment load is moved downstream, and it remains a problem.
- There is sediment loading from agricultural lands. Sediment basins are needed off-river. Identify problem areas and confine erosion. Move responsibility for sediment back to sources where possible. Then remove what cannot be controlled to maintain capacity of system.

## **Storage Opportunities**

- Compare cost effectiveness of acquiring land along river versus expanding overflow lands in Los Banos area.
- Madera Ranch proposal should be studied for potential for flood management, groundwater recharge, conjunctive use.
- Cooperstown Reservoir on Dry Creek could help New Don Pedro operations.
- Raise Friant Dam - Environmental groups fear loss of water to water users. Water users fear loss of existing water for additional environmental requirements. If the gross pool capacity is raised from 500,000 acre-feet to 1,200,000 acre-feet, Friant may need to maintain new space for flood management. Water could be evacuated quickly for beneficial purposes to provide flood management storage for the following water year. Some water could be used by San Joaquin River Exchange Contractors below Mendota Pool.

## **Backup Levee System**

- A system of back-up levees could be constructed parallel to and farther back from the existing levees, to increase the flow and volume capacity.
- Existing system could be used for 10- or 20-year floods, including snow-melt.
- Backup levee system would provide protection from major floods.
- System would not provide many opportunities for ecosystem restoration.
- Backup levee would not need to be as high as primary levee, because of additional conveyance.
- Could farm between levees.
- Only residences and buildings associated with farming operation would be allowable, residential development would not be permitted in the area between the levees. Use existing overflow areas where possible.
- Seepage into the area between levee systems during flood management operations in years of normal runoff could be a problem.
- Reinforce landside of primary levees with dredged material. Create low slope to minimize wave erosion.
- If existing levee system can provide design level of protection, and back-up levee system is used for added protection to limit regional flooding, it could be acceptable to local stakeholders. Current system does not provide designed level of flood protection.

## **SPIN-OFFS**

Sec 206 - Gravel pits

Sec 205 - Middle River Paradise Cut





## **MEETING NOTES**

### **SACRAMENTO AND SAN JOAQUIN RIVERS COMPREHENSIVE STUDY JOINT TECHNICAL SUPPORT GROUP MEETING Ecosystem Restoration and Flood Damage Reduction Sacramento River Watershed**

March 16, 1998

#### **GENERAL FLOODING AND RELATED ENVIRONMENTAL RESOURCE PROBLEMS:**

The group discussed the general flooding and environmental resource problems related to the Sacramento River flood management system. Following is a list of problem statements.

- The Sacramento River Flood Management System does not have the capacity for conveying peak flood flows (expressed in cubic feet per second, cfs) that it was designed for. Regardless of the existing capacity of the system, however, no objective levels of flood protection have been established for the system. It has also not been determined whether the level of protection should be consistent throughout the system or vary according to the value of property/production at risk of flooding.
- The Sacramento River Flood Management System does not provide reliable flood protection from one flood event to another or even during a single flood event because of inadequate levee structural integrity in some parts of the system
- Maintaining the Sacramento River Flood Management System is extremely costly due to the erosive nature of the flood flows that the current system configuration produces and the impacts to the environment that armoring the system results in.
- Because the Sacramento River Flood Management System relies in part on levees to provide flood protection, there is an inherent risk of catastrophic consequences due to failure of elements of the system. This risk has not been addressed adequately.
- The natural hydrologic and geomorphic processes that prevailed historically on the river have been largely lost as a result of confining flood flows between human-made levees.
- As a result of the loss of natural processes, fish and wildlife habitat has been lost or severely degraded.
- Mitigation for loss of habitat related to maintaining the Sacramento River Flood Management System (e.g., the Sacramento River Bank Protection Project) has been inadequate and/or unsuccessful because of perceived potential impacts to the structural integrity of the system (e.g., to levee integrity) and to the level of protection (i.e., capacity) the system provides.
- Restoration of environmental resources is severely limited by the lack of natural processes, by policy regarding vegetation in rock revetment, and by the lack of a methodology for comparing environmental benefits with the costs of providing those benefits.
- Invasion by exotic vegetative species threatens the survival of native species and the flow-carrying capacity of the flood management system.

**GENERAL COMPREHENSIVE PLANNING OBJECTIVES:** The group discussed the general objectives of the Comprehensive Study for developing a plan to address the flooding and related environmental resource problems associated with the Sacramento River Flood Management System. Following is a list of draft general planning objectives for review by the group.

- Improve flood management system wide.
- Reduce the risk of catastrophic flooding to urban areas.
- Reduce flood damage system wide.
- Minimize system operation and maintenance requirements.
- Improve system wide coordination of floodplain management activity among Federal, State, and local entities.
- Develop tools to analyze the hydrologic, hydraulic, geomorphic, and biologic processes of the system.
- Increase riparian, riverine, and floodplain habitat system wide.
- Contribute to threatened and endangered species recovery plans system wide.
- Contribute to the rehabilitation of a dynamic system (restoration of natural processes) to the extent practicable.
- Contribute to the preservation of historic agricultural productivity.
- Proceed with immediately implementable solutions to identified problems when consensus is reached.

**STUDY REACHES:** The group agreed that the Sacramento River Flood Management System should be studied by reaches that have distinct physical characteristics. The group agreed to use the four reaches established by the SB1086 process (and adopted by CALFED) for the mainstem of the Sacramento River from Keswick Dam to Verona, and to develop additional reaches for the rest of the mainstem and for the tributaries.

**POTENTIAL IMMEDIATELY IMPLEMENTABLE SOLUTIONS:** The group discussed two proposals for immediately implementable solutions to identified problems as part of the Comprehensive Study. These projects are:

1) Section 1135 (Project Modifications for Improvement of the Environment) project for modifying the operation and maintenance requirements for the Chico Landing to Red Bluff Project, a deferred flood damage reduction/bank protection project. The purpose of this 1135 project would be to allow vegetation to grow on the river banks that were armored under the Chico Landing to Red Bluff Project. The Reclamation Board would be the non-Federal sponsor of this project. Department of Water Resources (DWR) Staff to The Reclamation Board has drafted a letter requesting the Corps to initiate this 1135 project. The Corps will initiate this project upon receipt of the letter request and 1135 funding.

2) Section 205 (Small Flood Control) project for increasing the capacity of the Tisdale Weir/Bypass. Corps and DWR staff will meet to discuss the purpose and sponsorship of this project.

**SAN JOAQUIN RIVER GROUP MEETING  
March 18, 1998**

**DRAFT PROBLEMS & OPPORTUNITIES FOR DISCUSSION**

Flood Problems

Inadequate conveyance capacity

Channel sedimentation

Localized channel choke points - vegetation and sediment

Levee pinch points

Bridge restrictions

Land subsidence

Low summer flows allow growth of vegetation in the low-flow channels

Structural levee

Stability problems - undersized levee sections; designed in 1940's.

Seepage; basin soil foundations - too close to the river.

Upstream reservoirs

Limited storage on the San Joaquin and Tuolumne Rivers (relative to the rest of system)

Reservoirs managed individually - not as a system.

Institutional problems

No entity with channel maintenance responsibility below Merced River.

Difficult permitting process - numerous State and Federal agencies involved.

Land use choices that endanger structures - high levees for urban areas.

Ecosystem Restoration Opportunities

Exotic plant removal

Restore the river systems near gravel mining pits

Adjust early flood releases to benefit fishery

Find space for riparian habitat near river system

Find space for habitat planting in bypass

Restore geomorphic process to allow regeneration of riparian habitat

## **DRAFT PLANNING OBJECTIVES**

### **General objectives**

Reduce flood damages, risk, and O&M costs

- Improve levee reliability

- Reduce risk to lives and property

- Reduce seepage and related damages

- Improve reservoir operations to reduce damages for the entire system

- Streamline permitting process

Restore F&W habitat

- Reduce potential damage to ecosystem from gravel pit captures

- Improve reservoir operations to benefit fishery and riparian habitat

- Create additional riparian habitat

## **SAN JOAQUIN RIVER BASIN**

**April 1, 1998**

### **PROBLEMS**

#### **Flood Related Problems**

- The San Joaquin River levee and channel system does not have the capacity to convey the flood flows it was designed for. The levee system was originally designed to convey snowmelt events. However, since the construction of the upstream reservoirs, the primary flood concern is for rain flood events. The capacity of the system has diminished steadily over time. The following factors have contributed to diminish the flow capacity of the system.
  - Channel sedimentation throughout the system has diminished the overall flow capacity.
  - Localized channel choke points of vegetation and/or sedimentation cause flow restrictions leading to a backwater effect of even higher stages upstream of the restriction.
  - At the downstream limits of the existing project, the system appears to be undersized and does not extend far enough into the Delta to adequately pass design flows.
  - There are reaches in the system where the levee alignments converge to create pinch points that, at high flows, restrict capacity and create higher stages.
  - There are various bridges in the system that restrict flow and cause higher stages.
  - Land subsidence in the basin south of the Merced River has reduced the carrying capacity of the system, and has increased sedimentation in some reaches and erosion in others.
  - Very low summer flows contribute to the growth of vegetation in the low-flow channels which increase channel deposition and decrease conveyance.
- Although levee maintenance districts have been established to collectively maintain the many miles of levees in the system, no entity has responsibility to maintain the carrying capacity of the river channel from the Merced River downstream to the Delta.
- Some parts of the levee system do not provide reliable flood protection because of inadequate structural stability, basin soil foundations, and excessive seepage.

- Drainage ditches near the landside levee toe can shorten seepage paths, and often contribute to seepage and levee stability problems.
- The optimal use of the existing flood management system is prevented by current operation plans for the existing reservoirs and the need for additional storage, in the form of both reservoir storage and within the natural floodplain.
  - Flood releases are generally managed to minimize peak flows on the tributary rivers where the project element was authorized and not to reduce peak flows along the main stem of the river. This problem is aggravated by the fact that the channel system was not designed to carry the combined peak flow which results from sustained inflows from the various tributaries.
  - Based on past performance, and relative to the rest of system, there appears to be reservoir storage deficiencies on the upper watersheds of the San Joaquin and Tuolumne Rivers.
  - For most of the multi-purpose reservoirs in the system, opportunities are limited during flood operations to spread the degree of risk between potential loss of water supply and high flood releases. The water supply stakeholders are often not the same parties that will be damaged by higher reservoir releases and there is a reluctance to allow encroachment into the conservation storage.

### **Related Environmental Problems**

- The natural hydrologic and geomorphic processes that prevailed historically along the river system have been largely lost as a result of attenuation of flood flows and confining flood flows between engineered levees. As a result of this loss of natural processes, fish and wildlife habitat has been lost or severely degraded.
- Fragmentation and insufficient quantity and diversity of remaining riparian, wetland, and shaded riverine habitats are causing a loss of species numbers and community diversity.
- Restoration of ecosystem resources has been limited, in part, by the maintenance policies regarding vegetation on waterside slopes that are needed to give the existing levee cross section.
- Invasion by exotic vegetative species threatens the survival of native species and the flow-carrying capacity of the flood management system.
- In a number of places in the system, the river has captured deep pit gravel quarries located close to the existing river channel. These pit captures have created significant river channel

down-cutting, have disrupted the run-ripple-pool sequence, and have created deep lakes within the river system.

- Reservoir releases made in the autumn to evacuate the flood storage space can cause high flows for short periods. Salmon spawning during these periods could cause the loss of redds which may be stranded when flows are cut back. Additional information is needed to minimize this problem and to determine if flows can be adjusted to benefit spawning salmon.

### **Institutional Issues**

- Existing institutional policies and funding structures were not created to deal comprehensively with system-wide flooding and ecosystem issues. The existing institutional structure has led to an unsystematic, localized approach to regional problems.
- The process to obtain permits is often difficult because of the numerous State and Federal agencies authorized to manage particular, and sometimes conflicting, regulations and programs. In some cases, the cost to provide information related to obtain permits exceeds the cost to implement the activity in question.
- When making land-use decisions for areas near the river, the risk and consequences of catastrophic levee failure have not been adequately addressed. By allowing urban development behind high levees and in deep floodplains, many lives and structures have been put in harm's way.

### **PLANNING OBJECTIVES**

#### **Reduce flood damages, risk of levee failure, and maintenance costs**

- Improve levee stability and reliability to reduce the risk to lives and property.
- Increase flow carrying capacity to reduce flood damages.
- Reduce seepage and related damages on lands adjacent to the levee system.
- Improve system-wide coordination of floodplain management activities among Federal, State, and local entities.
- Improve use of the existing designated reservoir flood space to reduce damages for the entire system.
- Develop new flood storage space at onstream and offstream locations with the opportunity to benefit other uses with any increases in water supply yield.

- Streamline permitting processes.

**Protect and restore riparian, riverine, and wetlands habitats system-wide.**

- Create additional riparian, wetland, and shaded riverine habitats system-wide to improve habitat diversity, spacial distribution, and age class.
- Reduce potential damage to the river system from gravel pit captures.
- Improve reservoir operations to benefit fishery and riparian habitat.
- Contribute to threatened and endangered species recovery system-wide.
- Preserve agricultural productivity and the ecological value provided by agricultural land use.
- Develop new storage space at onstream and offstream locations with the opportunity to benefit other uses with any increases in water supply yield.
- Improve the dynamic hydrologic and geomorphic precesses to help sustain, enhance, and regenerate riparian and floodplain habitats.

**Resolve Policy Issues and Remove Institutional Barriers**

- Develop a funding process that maximizes potentials for shared sponsors to implement feasible system features.
- Implement improved Floodplain Management policies consistent with recommendations made by the FEAT Task Force on Floodplain Management.
- Streamline permitting processes.



## **MEETING NOTES**

### **SACRAMENTO AND SAN JOAQUIN RIVERS COMPREHENSIVE STUDY JOINT TECHNICAL SUPPORT GROUP MEETING Flood Damage Reduction and Ecosystem Restoration Sacramento River Watershed**

April 2, 1998

#### **GENERAL FLOODING AND RELATED ENVIRONMENTAL RESOURCE**

**PROBLEMS:** The group discussed the draft general problem statements that were proposed as a result of the previous (March 16) meeting. Following are revised general problem statements.

#### **Flood Management Problems**

- The Sacramento River Flood Management System may not have the capacity for conveying peak flood flows (expressed in cubic feet per second, cfs) that it was designed for. Several factors may be compromising the capacity; these factors follow.
  - Under some (backwater) conditions, the Tisdale Weir may not provide design capacity.
  - Some sections of levee (near Knights Landing and the Garden Highway, for example) have subsided.
  - The timing of coincident flows throughout the system for recent past floods has been different than the events for which the system was designed.
  - Sediment transport, erosion, and deposition conditions have changed since the current system was originally designed.
- The level of flood protection [whether expressed in terms of chance of exceedance (e.g., one-in-twenty chance in any year) or frequency of the largest flood that can be contained (e.g., 80-year flood)] that is provided by the Sacramento River Flood Management System is not known for many parts of the system. It is likely that the level of protection is not consistent throughout the system, and that the level of protection is not correlated to the value of property/production at risk of flooding.
- Some parts of the Sacramento River Flood Management System do not provide reliable flood protection because of structural integrity problems. Levee instability and seepage problems, for example, are due to inadequate levee and foundation materials, as well as the construction of drainage ditches on the landside of the levees.
- Maintaining the Sacramento River Flood Management System is extremely costly due to the erosive nature of the flood flows that the current system configuration produces and the impacts to the environment that armoring the system results in.
- There is little flexibility in operating the system to optimize flood protection because there is no system model that can evaluate operational changes.

## **Related Environmental Problems**

- The natural hydrologic and geomorphic processes that prevailed historically on the middle and lower reaches of the Sacramento River have been largely lost as a result of confining flood flows in reservoirs and between engineered levees. As a result of this loss of natural processes, fish and wildlife habitat has been lost or severely degraded.
- Mitigation for loss of habitat related to protecting (i.e., through the Sacramento River Bank Protection Project) and maintaining the Sacramento River Flood Management System has been inadequate and/or unsuccessful because of perceived potential impacts to the structural integrity of the system (e.g., to levee integrity) and to the level of protection (i.e., capacity) the system provides.
- Restoration of environmental resources is severely limited by the lack of natural processes (in the middle and lower reaches), by policy regarding vegetation in rock revetment, by the threat of restrictions on land use or system maintenance resulting from the presence of threatened and/or endangered species, by the institutional process of implementing emergency repairs, by the lack of institutional means to maintain environmental features, by the lack of a methodology for comparing environmental benefits with the costs of providing those benefits, and by the lack of an environmental resources vision for the system.
- Invasion by exotic vegetative species threatens the survival of native species and the flow-carrying capacity of the flood management system.

## **Institutional Issues**

- There is concern that the criteria that are usually used to determine optimal/acceptable/adequate level of flood protection (National Economic Development net monetary benefit maximization) do not appropriately address all effects (economic, social, and environmental benefits and costs) of potential solutions to flooding and related environmental resource problems in the Sacramento River basin.
- The flood and related environmental resources of the Sacramento River basin are managed in an incremental manner that responds reactively to problems as they become critical. The existing institutional and financial elements of flood and environmental management do not address the problems from a system-wide perspective.
- There is an inherent risk of catastrophic consequences due to failure of elements of the system. This residual risk has not been addressed (assessed, communicated, reduced) adequately. Allowing urban development behind high levees and in deep floodplains has put many lives and structures at risk.

**GENERAL COMPREHENSIVE PLANNING OBJECTIVES:** The group reviewed the draft general objectives that the comprehensive plan should address, as presented at the last meeting. Following are the revised objectives.

**Improve Flood Management throughout the Sacramento River Flood Management System**

- Identify flood protection level goals for the parts of the system taking into account the associated flood risk and the engineering, economic, and environmental feasibility of providing protection.
- Improve system reliability to reduce the risk to lives and property.
- Reduce the risk of catastrophic flooding to urban areas.
- Minimize Flood Management System operation and maintenance requirements and associated costs.
- Communicate residual flood risk throughout the Flood Management System.
- Develop tools to analyze the hydrologic, hydraulic, geomorphic, and biologic processes of the Flood Management System.
- Improve coordination of floodplain management activity related to the Sacramento River Flood Management System among local, State, and Federal entities.
- Allow for adapting the flood system management in response to changes over time.
- Compensate for unavoidable adverse economic, socio-economic, and environmental impacts associated with flood management actions.

**Protect and Restore Riparian, Riverine, and Wetlands Habitat System-Wide**

- Use an ecosystem approach to increase riparian, increase flood basin, and improve riverine and floodplain habitat throughout the Sacramento River Flood Management System.
- Contribute to threatened and endangered species recovery throughout the Flood Management System.
- Contribute to the restoration/rehabilitation of a dynamic system (natural hydrologic, geomorphic processes) to the extent practicable.
- Contribute to the preservation of historic agricultural productivity and the ecological value provided by agricultural land use.
- Incorporate ecosystem restoration features into the design of elements of the Sacramento River Flood Management System.
- Proceed with immediately implementable solutions to identified problems when consensus is reached.

## **Resolve Policy Issues and Remove Institutional Barriers**

- Develop a funding process that maximizes the potential for co-sponsorships to implement needed system features.
- Implement improved floodplain management policies consistent with recommendations made by the FEAT Task Force on Floodplain Management.
- Streamline permitting processes.

**STUDY REACHES:** The group agreed that the Sacramento River Flood Management System can be described in reaches that have distinct physical characteristics. The group agreed to use the reaches established by the SB1086 process (and adopted by CALFED) for the mainstem of the Sacramento River from Keswick Dam to Verona, and to develop additional reaches for the rest of the mainstem and for the tributaries. The group also recognized, however, that measures must be evaluated from a basin-wide perspective since their effects on flooding and ecosystem restoration may extend throughout the system.

**POTENTIAL IMMEDIATELY IMPLEMENTABLE MEASURES:** The group discussed the proposal for an immediately implementable measure to identified problems as part of the Comprehensive Study. The Section 1135 project (Project Modifications for Improvement of the Environment) modifies the operation and maintenance requirements for the Chico Landing to Red Bluff Project, a deferred flood damage reduction/bank protection project. The purpose of this project is to allow vegetation on the river banks that were armored under the Chico Landing to Red Bluff Project. The Reclamation Board is the non-Federal sponsor of this project. Department of Water Resources (DWR) staff to The Reclamation Board has drafted a letter requesting the Corps to initiate this 1135 project. The Corps will initiate this project upon receipt of the letter request and 1135 funding.

Members of the group identified a reach of the river located six miles south of Chico Landing which could reflect how natural revegetation may occur in the reach of the proposed 1135 project. This site apparently includes areas where trees fell but did not damage the rock bank protection.

## **Sacramento and San Joaquin River Basins Comprehensive Study**

### **Policy Focus Group Meeting**

**Meeting Date and Time:** June 30, 1998  
1:00-5:00 P.M.

**Location:** U.S. Army Corps of Engineers  
1325 J Street  
Sacramento, CA

### **Meeting Summary**

Mike Nolan of the U.S. Army Corps of Engineers (Corps) welcomed the attendees and provided a brief description of the Sacramento and San Joaquin River Basins Comprehensive Study—goals, the planning area, and the need to coordinate work with other programs, such as the CALFED Bay-Delta Program (CALFED). He explained that the Interim Report on the first phase of the Comprehensive Study is scheduled for April 1999, and that important policy issues and possible solutions for improving policies need to be incorporated into plans for the long-range management of the river systems. He indicated that both the 1997 Governor's Flood Emergency Action Team (FEAT) Report and the 1994 Interagency Floodplain Management Review Committee Report, (Sharing the Challenge: Floodplain Management into the 21st Century), provide valuable background and guidance for the Comprehensive Study. Mr. Nolan added that ideas from all attendees at these policy focus group meetings are key to the development of a viable floodplain management plan.

Pete Rabbon of The Reclamation Board explained that the Corps is working with The Reclamation Board on the Comprehensive Study. He asked for the help and participation of all attendees; he emphasized that this study is a team effort. He stated that The Reclamation Board hopes to have the Phase I Interim Report sent to Washington, D.C. to set the stage and to build support for the next part of the Study. The Reclamation Board wants to plan for floodplain management in the Central Valley in a comprehensive manner, and intends to work to first identify policy issues and then identify potential solutions.

Colonel Galt (Corps) introduced Dr. Gerald Galloway as the keynote speaker. Col. Galt stated that Colonel Klasse, who had worked with Dr. Galloway at West Point, had invited Dr. Galloway to this meeting because of his involvement in leading the review of the Mississippi Valley flooding of 1993.

Dr. Galloway opened his keynote address by stating that rivers serve multiple functions—transportation, agriculture, water supply, support of natural systems—and that those

who plan for river systems will need to reconcile the many different interests and demands on the river system. He described the goals of the Interagency Floodplain Management Review Committee for the Mississippi Valley (e.g., Why did it flood? What programs or policies should be changed or instituted?), reviewed the findings and lessons learned, described the recommendations, and pointed to positive policy changes and greater awareness of river systems and floodplain management at both the national and international levels. Based on his experience, Dr. Galloway closed by sharing these guidelines for successful planning:

- Recognize all the key players.
- Understand common themes identified in all watershed planning.
- Build partnerships.
- Take advantage of technology.
- Involve all elements of the public in this complex political, social, and technological interaction—water resources leaders must educate, participate, and influence.

***(Copies of Dr. Galloway's overheads are attached)***

Dave Ceppos, meeting facilitator from Jones & Stokes Associates, emphasized that this collaborative process provides the opportunity for developing creative and productive new approaches to reconciling the many varied interests and demands related to the Sacramento and San Joaquin River basins. He recapped the purpose of this meeting and subsequent follow-up meetings and defined his role as facilitator—to enlist participation, look for common ground, and reconcile differences. Alan Solbert, Jones & Stokes Associates, provided a handout of potential policy issues to be discussed by the group. He emphasized that this list was a starting point, and he solicited feedback on other topics to be included.

The group discussed a wide range of policy and procedural issues affecting regional flood management (land use planning and master planning) and floodway management (maintenance of existing infrastructure and levees). Initial comments dealt with the need to take a watershed-scale perspective, and to look at the system over an extended time frame to properly assess failures in the system as a whole and not simply apply site-specific technical fixes. There is also the need to adopt multiple objectives for basin planning (as opposed to allowing flood management concerns to drive solutions), and to restore physical processes to support ecosystem and habitat restoration. Institutional inertia, gridlock, and the absence of a shared vision were identified as the primary reasons for the current fragmented and sometimes conflicting approaches to managing the river basins. Participants felt, however, that many existing policies have the needed flexibility built into them already, but that breaking the gridlock and using these tools in a new and innovative way will be the challenge. Susan Ramos (Corps) commented that defining constraints and identifying ways to overcome these constraints is the reason for conducting these meetings.

Many participants believed that sometimes-conflicting floodplain designations by Federal agencies is a significant problem that has caused the agencies a loss of credibility with the public; a unified method to analyze flood risk is recommended. Loss of hydraulic capacity as a result of vegetation and sediment accumulation and the restrictions imposed on maintenance activities to restore design capacity were discussed as other common problems. It was pointed out that the goal of the Federal Endangered Species Act (ESA)—often considered an impediment to floodway maintenance—is species recovery, and that the ESA can provide opportunities for that recovery as well as ecosystem restoration. Also discussed was the concept of safe harbor protection to encourage acceptance of non-structural approaches to flood management and ecosystem restoration (e.g., setback levees).

Compliance with Section 404 of the Clean Water Act (CWA) was mentioned as another cumbersome regulatory process; group members noted several concerns about Section 404 including cost; difficulty in interpreting the process to determine the alternative that is least environmentally damaging and practicable; and difficulty in meeting the requirement to avoid and minimize impacts, not just mitigate for them. The Corps planning process, and specifically the National Economic Development (NED) analysis process, were discussed at length. Hydraulic impacts, which result from the dynamic adjustment of components of the flood protection system, have not been modeled until recently. These factors weigh heavily in policy and planning reviews.

It was noted that the Comprehensive Study, which includes any suggested solutions for policy improvements from these meetings, is not intended to be definitive, but iterative. Involved stakeholders do, however, need to initiate action for change—the Federal and State governments cannot solve all problems. Some issues can be resolved in an effort to arrive at workable solutions, but the participation of all affected parties is critical to success. It was recommended that, in advance of the Phase I Interim Report, the Corps and The Reclamation Board enlist the assistance and support of legislators and agency management.

### **Discussion of Topics by Meeting Participants**

The following paragraphs summarize issues and ideas expressed by participants during the meeting. The material is organized by general topics, rather than in chronological order.

#### **Floodplain Designations and Floodway Management**

Floodplain mapping objectives, standards, and methodologies used by the Federal Emergency Management Agency (FEMA) and by the Corps are different, a condition that is not well understood by the public. This lack of understanding by the public undermines the credibility of the Federal agencies, their processes, and their maps. The primary distinction between the approaches of the two agencies pertains to measuring discharge: FEMA uses

computed probability (for insurance) and the Corps uses expected probability (for project evaluation). FEMA flood insurance premiums are based on FEMA floodplain maps and are sometimes subsidized, not actuarially based. These premiums are determined by existing risk to property owners, not by risk under total build-out conditions. This arrangement could result in overcharging existing policy holders because of speculative future land development.

One suggestion to resolve these differences in floodplain maps is to establish methodology on a basin-by-basin basis with State oversight. In fact, a draft Floodplain Management Element has been prepared by the State Office of Planning and Research for inclusion in the State's General Plan Guidelines for local general plan development. It was suggested that The Reclamation Board be designated as the agency for reconciling these differences. The Reclamation Board could recommend the most accurate way to analyze basin flood risk, because their standards are more stringent than those of FEMA. FEMA should defer to State floodplain management guidelines. The importance of ongoing data collection to maintain and update baseline data (river cross-sections, long-term records) for risk assessment was emphasized; however, funding is not available for that purpose.

Participants pointed out that a major issue with floodplain designations, regardless of mapping methodology, is that these designations are ephemeral in nature. The floodplain is dynamic, and the public should be informed to prevent a false sense of security. It was suggested that the term "100-year floodplain designation" be called a "critical risk floodplain," so as to not imply that, if flooding recently occurred to up to that elevation, the public is safe for another 100 years.

The engineering concept of probability or likelihood is thereby avoided and so is concomitant misunderstanding of such terms. The FEAT report made recommendations related to floodplain risk management such as a 2-foot freeboard above FEMA base flood elevation levels, and provision for zero surcharge. If appropriate, these requirements should be incorporated into the Phase I Interim Report.

Another problem is loss of hydraulic capacity of floodway infrastructure. It is important to maintain design capacities, but maintenance to baseline capacity levels is impeded because vegetation management requires compliance with (and sometimes mitigation under) CWA, ESA, and the California Environmental Quality Act (CEQA); low summer flows do not allow for the flushing out of large amounts of accumulated sediments.

## **Environmental Impact Regulatory Process**

**Endangered Species Act.** It was stated that the best solution for ESA compliance may be to find ways to integrate the goals of ESA (e.g., species recovery) with floodplain management. If recovery is attained, there would be no need for ESA compliance or safe harbor-type protection. Concern was expressed regarding how non-structural flood management options



can be accepted (e.g., setback levees that bring habitat in proximity to farms) without safe harbor-type protections. USFWS commented that the safe harbor policy is not a guarantee.

Additional ESA concerns concerned the source and validity of data used for listing decisions. There is also the need to control introduced or exotic species to help native species recover. One participant believed that the modern farmer is dealing unfairly with past practices, urban development, and cumulative impacts which result in threats to listed or candidate species and their habitat.

**Clean Water Act—Section 404.** It was mentioned that the cost of compliance with Section 404 of the CWA can exceed the cost of implementing proposed projects. One example given involved a levee district on the lower San Joaquin River where an individual permit and an EIS were required; the project had to be abandoned because the cost to meet regulatory requirements exceeded the levee district's ability to assess landowners. One solution might be regional general permits with programmatic Section 7 Biological Opinions for USFWS. Other problems noted included difficulty in interpreting the alternative that is the least environmentally damaging but most practicable because of uncertainty about whether environmental effects associated with flood damage can be included in the analysis. Another obstacle identified with CWA compliance is the Corps' and the EPA's sequencing requirement: projects should first avoid or minimize effects on jurisdictional waters and, then, compensate for impacts that are unavoidable. Sequencing can create a conflict with Corps planning process and with NED analysis, the latter of which assumes that all adverse effects can be mitigated. In addition, the NED process is typically completed, or much effort expended, before the Section 404 permit application process begins. It was recommended that an inter-agency dispute resolution process (e.g., 404(q) Memorandum of Agreement) could be adopted to minimize conflicts between objectives of different agencies and to better integrate planning/regulatory procedures and processes.

### **Corps Planning Process—National Economic Development (NED)**

NED is a process used by the Corps to compare expected benefits to costs as a means of ensuring that the recommended work is economically feasible. NED provides the economic rationale to deny special-interest projects and to help control the Federal budget. NED is applied through interpretation of principles and guidelines, and historically, it has not adequately affixed value to unquantifiable benefits of projects, such as social and environmental benefits. It was noted, however, that the guidelines do provide for analysis of unquantifiable benefits and that innovative approaches can allow consideration of such benefits to override conventional NED results, as long as the analysis and rationale are defensible. It was suggested that, in order to develop creative evaluative criteria, there needs to be involvement of stakeholders early in the NED process.

The aim of the Comprehensive Study is to involve as many participants as are willing to assist in this effort. A joint approach benefits all interested parties. However, the costs involved in such an approach may more greatly affect local sponsors which, in turn, could lead to their lack of participation in the planning process. For example, the Napa River flood management project contains ecosystem restoration and other amenities; the subsequent NED evaluation was innovative and successful, but local needs did not fit into the conventional NED, and the local sponsor may need to bear greater costs in the cost-share. The downside to this approach may be that only well-funded local sponsors succeed at incorporating unquantifiable benefits into their flood management projects. NED also considers “separable elements.” This approach requires that each component of the project or increment of flood protection be justified. To incorporate unquantifiable benefits and for an improved evaluation process, it was suggested that NED needs to evaluate projects on a regional and system-wide basis, and should be broadened to allow for a resource approach to the analysis.

It was noted that in using NED, it is hard to justify increased flood protection for agricultural land because of the current land value. Potential damages are significantly lower in agricultural areas than in developed areas. It was suggested that the future value of prime agricultural land, when reduced acreage due to development causes scarcity, be used in the NED evaluation.

Dr. Galloway stated that now is an opportune time to partner with the Mississippi Valley Comprehensive Study initiative to recommend new approaches to NED. Also, study group members should not underestimate their ability to influence Congress.

## **Hydraulic Impacts**

All incremental changes in the flood management systems, which are being dynamically adjusted, will change how those systems function. Floodplain designations are constantly changing. The quandary is whether upstream users are responsible for, and must mitigate for, changes to the system that cause increases in downstream flood risk. The hydrology and hydraulics (H & H) models will allow the Comprehensive Study team to effectively look at the entire flood management system. A common baseline is needed to establish the significance of an impact. Currently, risk is evaluated by The Reclamation Board on a case-by-case basis. The question was raised regarding the Federal government policy on hydraulic impacts and how responsibility is assigned to mitigate these impacts.

A concern was expressed that the Sacramento and San Joaquin River basins cannot afford to wait for a comprehensive solution because incremental build-out is being approved and is underway. A system-wide approach is ultimately necessary to provide protection into the future and to avoid building more projects to fix existing projects (e.g., prevention vs. correction). The Comprehensive Study is intended to address current problems and recommend ways to anticipate future problems. Methods to assess hydraulic impacts should be included in the study.

## **Future Steps**

As discussed, two follow-up policy focus group meetings will be scheduled to better define problems, and to identify possible solutions and constraints to solutions. The topic of the first follow-up meeting will be Environmental Impact Regulatory Process; the topic of the second follow-up meeting will be Floodplain Designations and Hydraulic Impacts. Both meetings are planned for August 1998. Information on specific dates, times, and locations will be sent to meeting participants. Also, as a result of the initial focus group meeting, a working group will be established to further discuss the Corps Planning Process and NED.



# Attachment

*Copies of Dr. Galloway's overheads are attached.*



# FACING THE CHALLENGE: NEW DIRECTIONS IN COMPREHENSIVE WATER MANAGEMENT

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Policy Focus Group Meeting  
Sacramento and San Joaquin River Basins  
Comprehensive Study  
Sacramento, California  
June 30, 1998

Gerald E. Galloway, Jr.  
Industrial College of the Armed Forces  
National Defense University  
Washington, DC

The speaker does not represent anyone or any agency in Washington. The opinions expressed are his own and do not reflect, necessarily, the positions of either the Administration or the National Defense University.

## Rivers The Lifelinks of Society

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Support:

- Transportation
- Water Supply
- Hydropower
- Agriculture
- Natural Systems
- People

## PRESSURE

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- Economics
- Social Needs
- Engineering
- Environment
- Nature

DEVELOP or LEAVE ALONE



## 1993 Mississippi Flood Impacts

- Costs: \$12-16 Billion; Significant Non-Monetary Damages
- 6.6 Million Acres Flooded
- > 38 Deaths

## White House Floodplain Management Review Committee

- Determine Causes of '93 Flood
- Evaluate Floodplain Management Programs
- Recommend Changes in Policies Programs and Procedures
- Recommend Legislative Initiatives

## LESSONS FROM THE FLOOD OF '93-I

- Flood Was Significant Hydrometeorologic Event
  - Levees and Locks & Dams Did Not Cause the '93 Flood
  - Loss of Wetlands and Upland Natural Storage Did Not Cause the Flood
- Major Floods Will continue to Occur

## LESSONS FROM THE FLOOD OF '93 - II

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- Participation in Flood Insurance Program Poor
- Many Structures Unnecessarily Located in Floodplain
- Human Activity Caused Significant Habitat Loss
- Management of Floodplain and Basin Activities Diffused
- Upper Mississippi Basin Lacks Flood Damage Prevention Strategy

## IMMUTABLE FLOODPLAIN RULES (Before and After the Mississippi Flood)

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- Water Flows Downhill
- Water Rises
- Water Creates Natural Boundaries (Basins) and Does Not Respect Political Boundaries
- Moving Water Off One Location Causes It to Go to Another

## Recommendation I

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- Share Responsibility and Costs for Floodplain Management Among Federal, State, and Local Governments and Impacted Populace

## Recommendation II

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- Avoid Use of Floodplain: Don't Develop When You Don't Need To

## Recommendation III

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- Minimize Damages to Development that Does Occur and Has Occurred
  - Hold the Water Where It Falls
  - Floodproof
  - Relocate Endangered Structures\*
  - Acquire Marginal Lands\*
  - Use Levees/Floodwalls, When Justified

## Recommendation IV

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- Mitigate Damages that Will Occur
  - Establish Early Warning Systems
  - Insure Those at Risk
  - Educate Present and Potential Flood Occupants

## Recommendation V

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- Deal with the Floodplain as Part of the River Basin System

## SINCE THE MISSISSIPPI FLOOD

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- Another Mississippi Flood ('95)
- Georgia - Florida Floods, '94
- Texas - Houston Floods, '94
- California Floods, '95, '97, '98
- Middle Atlantic Floods, '96
- Oregon Floods, '96
- Red River of North Floods, '97

## SINCE THE MISSISSIPPI FLOOD

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- Greater National Awareness
- Flood Insurance Reform
- State Attention to Floodplain Management
- Relocations and Land Acquisitions
- Administration Budget Initiatives
- EPA Focus on Watersheds
- Disaster Task Force Report
- Farm Bill w/ Conservation Provisions
- Western Governor's Endorsement

## SINCE THE MISSISSIPPI FLOOD

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- California Post-Flood Actions
  - Legislative Hearings
  - Flood Task Force
  - Federal-State Partnership
- Red River post-Flood Actions
  - Balanced Approach to Damage Reduction
  - Consideration of Environmental Concerns
  - Use Technology

## OTHER 'SUSTAINABLE' EFFORTS

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- Bureau of Reclamation
  - Re-Look Current Projects
  - Remediation of Environmental Problems
- Everglades Project
  - \$1.5 Billion; Multi-Agency
  - Restoration and Remediation
  - Support Agriculture, Tourism, Water Supply

## INTERNATIONAL RIVER BASIN MANAGEMENT MEETINGS

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- Europe - Perugia, Italy November 1995
- Latin America - Foz do Iguacu, Brazil December 1995
- Mekong River - Wye Island, Maryland December 1995
- India - Hyderabad, May 1996
- IAHS, Anaheim, June 1996
- Rivertech96, September 1996
- RIMABOD - Wallingford, England

## COMMON THEMES

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- Rivers Are Key to Development
- Crowding the River Can:
  - Create Flood Hazards
  - Endanger the Environment
- Understanding Basin Interactions is Critical
  - Upstream-Downstream
  - Cross-river

## COMMON THEMES

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- Basin Planning Requires
  - Full Participation of ALL Interested Parties
  - Vision of Future
  - Consideration of Alternative Futures
  - Systems Approach
  - Use of All Tools

## Recognition of Players

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- Governments at all Levels
- Citizen Groups
- Individuals
- Businesses
- International Governmental Organizations
- Non-Governmental Organizations
- Etc.

## COMMON THEMES

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- PARTNERSHIPS
  - Considering Competing Uses
  - Among Nations/Stats/Cities
  - With Communication Among Parties
  - Under a Plan

## COMMON THEMES

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- Take Advantage of Technology to
  - Disseminate Information
  - Obtain Planning Data - River and Land
  - Develop Geographic Information Systems
  - Manage Basin Systems

## THE CHALLENGES

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Basin Development and Management Must Involve All Elements of Society in Complex Political, Social and Technical Interaction

## THE CHALLENGES

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- Those Interested in Water Resources Must Lead the Way in This Interaction
  - EDUCATE
  - PARTICIPATE
  - INFLUENCE





## **Sacramento and San Joaquin River Basins Comprehensive Study**

### **Policy Focus Group Meeting Ecosystem Restoration, Flood Damage Reduction, and the Regulatory Process**

**Meeting Date and Time:** August 18, 1998  
12:30-4:30 P.M.

**Location:** U.S. Army Corps of Engineers  
1325 J Street  
Sacramento, CA

### **Abstract**

The U.S. Army Corps of Engineers and the Department of Water Resources/The Reclamation Board conducted a policy focus group meeting to solicit stakeholder input for the Sacramento and San Joaquin River Basins Comprehensive Study on the subject of ecosystem restoration, flood damage reduction, and the regulatory process. Discussion of potential measures for flood damage reduction that may be included in the Comprehensive Study was used as a method to examine constraints—policy and regulatory, land use, and economic—to implementation. Important themes on policy and other constraints that emerged from the discussion were:

- Changing existing laws and policies may not be necessary, just the interpretation and application of such laws and policies;
- Establishing new policies and institutional roles to effect implementation of some of the measures may be required where none exist;
- Adopting non-structural solutions for flood damage reduction is strongly preferred under the Federal environmental regulatory process, specifically the Clean Water Act and Endangered Species Act;
- Managing non-structural solutions is considered less expensive from a long-term operation and maintenance perspective, but it may be initially as expensive as structural solutions to implement due to the high cost of purchasing land or easements;
- Fostering collaboration and looking for consensus will require all stakeholders to recognize that it may not be possible to maintain the status quo approach to flood protection in a region; all stakeholders must concede something to achieve

- a comprehensive solution; and
- There is an undeniable challenge in addressing the resolution of land use and economic issues, and in overcoming public perception and fear of unproven flood damage reduction measures.

## **Meeting Proceedings**

### **Introductions and Background**

Susan Ramos, U.S. Army Corps of Engineers (Corps), welcomed the attendees and provided a brief description of the Sacramento and San Joaquin River Basins Comprehensive Study (Comprehensive Study). Ms. Ramos discussed the goals and objectives of the Comprehensive Study, emphasized that this study is of a large magnitude, and is a multi-objective study. She reviewed the current timeline, and reiterated the need for coordination with other regional planning initiatives (e.g., CALFED, SB 1086, San Joaquin River Riparian Habitat Management Program, etc.). Work underway includes (1) developing the study framework and suggested flood damage reduction measures that integrate ecosystem restoration; and (2) developing hydrologic and hydraulic models. She explained that the Comprehensive Study began in 1997 and it will continue over a four-year period. An Interim Report on Phase I will be released in April 1999; a final report will be produced at the end of the study period (within four years).

As an integral part of the Comprehensive Study, the Corps and The Reclamation Board are conducting policy focus group meetings with stakeholders to share ideas on how to address policy and regulatory conflicts associated with implementation of flood damage reduction and ecosystem restoration measures. An initial outreach meeting was held on June 30, 1998. At that time, a list of policy issues and institutional barriers was identified. The group further expanded on and clarified environmental policy and regulatory barriers, and discussed possible solutions, with the understanding that not all issues can be readily resolved.

Mike Bonner will be replacing Ms. Ramos as head of the Corps' contingent on the Comprehensive Study Team. He stated that this process is very much a collaborative, team effort, and that the generation of dialogue and exchange of opinions and ideas are critical components of the Comprehensive Study. The results of the Policy Focus Group Meeting discussions will be used in the development of the Phase I Interim Report.

## **Meeting Format**

Dave Ceppos, meeting facilitator from Jones & Stokes Associates, explained that the agenda distributed to the attendees is a framework to use for the discussion, and that the agenda would not necessarily be followed point-by-point. He stated that the intent of the meeting is to examine environmental regulatory processes in a realistic context. Attendees should use the discussion of possible flood damage reduction measures as a method to brainstorm policy constraints and barriers.

Mr. Ceppos asked the group if they had any items that should be added to the meeting agenda or suggestions to the overall meeting process. It was recommended by the group to increase stakeholder involvement by expanding the mailing list of the Comprehensive Study. Greater participation would increase the information base, and assist with adoption of the Comprehensive Study recommendations. It was suggested that the stakeholder base include more local government and advocacy interests. The group further stated that it would be beneficial to the Comprehensive Study to have a Statewide constituency, not just the Sacramento and San Joaquin River basins. Regional meetings would be appropriate to encourage this larger participation. From the standpoint of meeting schedules, it was suggested that more lead time be provided to attendees. In particular, farmers and ranchers are interested, but they need more advance time.

## **Examples**

Mr. Ceppos began the group discussion by asking participants to discuss situations regarding the interface of environmental regulations and flood damage reduction projects, and thus provide some examples of what is working and what is not.

The first example dealt with the fact that Corps and other Federal projects are exempt from Section 1600 of the California Fish and Game Code. This exemption involved the bank protection project for the Lower American River. Securing a streambed alteration agreement from DFG in compliance with Section 1600 allows DFG to make recommendations to minimize project impacts on aquatic species and wetlands. This exemption, however, may preclude active collaboration of DFG in the development and implementation of measures proposed in the Comprehensive Study. DFG may have input, but no authority in the study.

Another example involved the Corps' environmental restoration project in the Yolo Basin Bypass. During the establishment of restored habitat within the bypass, public concerns were raised that those endangered species would move in, and use the habitat, and impede basin management of water resources and agriculture. To resolve this matter and to address the concern, a Memorandum of Understanding (MOU) between the Department of Water Resources, DFG, the USFWS, and farmers was successfully entered into, with DFG responsible for integrating the management of flood damage reduction and wildlife.

A final illustration was presented regarding the National Marine Fisheries Service (NMFS). NMFS has worked with landowners to provide habitat for anadromous fish, such as shaded riverine aquatic (SRA) habitat, and to assist with species recovery under the ESA. These efforts have, at times, conflicted with the objectives of the Corps, The Reclamation Board, and local flood control district levee maintenance. There is public concern that trees will be ripped out during floods and thus undermine the integrity of the levee, reduce flow capacity, and impair inspection. Such is the case when there is no toe berm for planting at the base of levees. Integrated policies and public information are needed regarding allowable planting on levees. Also required is multi-purpose projects, like setback levees that reduce the need for operation, maintenance, and repair, and provide space for habitat restoration. This problem is pronounced because local flood control district approaches to maintenance are piecemeal and isolated from a systematic approach. In addition, small districts have limited budgets for maintenance; they desire limited maintenance commitments. In an effort to resolve this issue, it was suggested that an assessment be conducted at the affected area(s) to determine whether vegetation contributed to levee failures, or, conversely, contributed to stability.

## **Review of Environmental Regulations**

Mr. Ceppos then reviewed with the group the environmental regulations listed on the agenda. A synopsis of selected regulatory topics was provided for clarification. A safe harbor-type provision is a proposed Federal policy which provides incentives for non-Federal landowners to establish habitat (above an agreed-upon baseline) without liability concerns regarding future takings. The aim of the policy is the recovery of listed endangered species by working with private landowners. Determining which adjacent landowners should be included in such agreements is an important policy issue.

The State Lands Commission Land Use Lease Permit process was also reviewed. A permit from the State Lands Commission (SLC) is required for projects occurring on lands owned by the State (i.e., navigable waters and tidal lands). Projects must undergo an environmental review process and be consistent with the public trust. Some examples would include the placement of a pier or dock in a waterway, or the placement of spawning gravels. Master lease agreements with project-specific amendments can be prepared.

Encroachment permits (The Reclamation Board, California Department of Transportation, railroads) were also discussed. The Reclamation Board requires an encroachment permit for any project in, over, or through levees or bypasses and designated floodways to ensure that floodflows are not restricted. Generally, adverse effect on the 100-year floodplain is used as the threshold for impacts. The Reclamation Board has approved specifications and criteria for project planning. Similarly, a California Department of Transportation (Caltrans) encroachment permit is necessary in project areas where Caltrans bridges may be affected.

National Historic Preservation Act (Section 106) is a compliance requirement for all Federal agencies and is regularly encountered since historic encampments of Native Americans and early settlers occurred along rivers.

### **Group Discussion of Policy, Land Use, and Economic Constraints**

Prior to the discussion of policy constraints and institutional barriers, the group listed measures that could be implemented integrating flood damage reduction and ecosystem restoration. It was emphasized that the group should not attempt to evaluate the measures at this point, but to use their ideas to examine problems with or constraints to implementation. The group identified eleven measures including:

- Increasing floodplain and floodway capacity;
- Securing programmatic flood easements;
- Raising and strengthening levees;
- Creating additional upstream storage;
- Restricting future urban growth in the floodplain;
- Expanding and creating bypasses;
- Incorporating onsite stormwater detention into future development;
- Managing the upper watershed to increase water runoff retention;
- Re-operating existing facilities; and
- Maintaining existing floodway capacity.

Six of these measures were discussed in detail by the group. The following paragraphs summarize their discussion, and are not necessarily in chronological order.

#### Increasing Floodplain and Floodway Capacity

Setback levees are an example of a measure to increase floodplain and floodway flow, and storage capacity (rather than expand upstream storage); allow for establishment of vegetation and habitat; and provide for re-introduction of natural river processes. The participants agreed that implementing setback levees has important implications for land ownership, future land use, and costs. Most of the land adjoining rivers and floodways is privately owned; use of this land for increasing flood storage requires a willing seller (of fee title or easement) to avoid an encroachment or possible taking. Adequate, creative incentives as well as a program for dealing with private landowners will be necessary to participation. Condemnation procedures could be used, but they require proof that there is no other way to accomplish the project purpose. Farmers would need assurance that flood protection will increase and that agricultural production from the land will not diminish or be lost. Another significant issue for private landowners is the severing of riparian water rights. One possible solution is to acquire a flood easement on the land which allows the landowner to retain the water right (see paragraphs below).

It was pointed out that local jurisdictions may resist setback levees, because the potential future economic base may be reduced, and ongoing operation and maintenance (O & M) costs may increase. Planning will have to take into account funding for local flood control districts to properly maintain a baseline of vegetation and habitat in floodways, so that both flood capacity and habitat values are retained. One option is to establish regional mitigation endowment funds, provided by projects which adversely effect flood capacity, and to allocate those funds to local districts for maintenance. In situations where local districts must repair/expand levees and remove habitat beyond the baseline, thus causing mitigation, State subvention funds could be allocated for mitigation.

From the perspective of Section 404 Clean Water Act (CWA) regulatory, if setback levees will result in discharge in waters of the United States and a standard permit is required for the project, a 404(b)(1) alternatives analysis must be prepared. Given the criteria of cost, logistics, and technology used to determine the least environmentally damaging but practicable alternative (LEDPA), setback levees may be the most environmentally-favorable alternative that achieves the project purpose, but they may not always meet the practicability test. The primary reason is the difficulty in quantifying the long-term environmental benefits, particularly when compared to immediate economic impacts. It was mentioned that using the Federal Principles and Guidelines (P&G) evaluation to focus on and quantify environmental benefits would assist in the practicability analysis of setback levees under 404(b)(1). Additionally, the P&G evaluation can provide quantifiable data to the 404(b)(1) permitting process related to the long-term economic benefits of increased capacity, reduced risk, and reduced maintenance costs for setback levees.

Setback levees that incorporate active ecosystem restoration may be opposed by adjacent landowners concerned about listed ESA species using the habitat, and moving into adjoining private land. The assurance of safe harbor-type protection would be essential to procure support from local landowners.

#### Securing Programmatic Flood Easements

Securing programmatic flood easements on private land is another example of a measure to increase floodplain and floodway flow and storage capacity, and to provide for re-introduction of natural river processes. The group noted that flood easements are most feasible in zones that infrequently flood. These easements can be used as part of a “designed overflow” program; owning agricultural land with a flood easement would not make sense if frequent and prolonged inundation precludes growing crops. Options to make flood easements more economically feasible include (1) increasing the cost of the easement proportionate to any decrease in cultivation potential; frequency and duration of flooding is already a factor in the Corps’ assessment of land values to calculate the economic benefit of a flood management project; (2) compensating farmers for flood damage to crops when floodwaters do not subside. (Continuing authorization and appropriation from Congress would be necessary for this

option); and (3) expanding use of the Pump Out Program which calls for pumping water off designated land if the water does not drain within a prescribed timeframe. Participants stated that it would be beneficial to have guidelines/mechanisms to assist in coordinating these concerns with landowners immediately after a flood. It was noted that the FEMA flood insurance program, as currently structured, presents some policy conflicts and disincentives for measures like setback levees and flood easements (which increase natural channel capacity), compared to structural solutions like raising levees. The FEMA program does not recognize residual flood risk to landowners behind levees (which increases the incentive for levees); and flood damage occurring in the 100-year floodplain is reimbursed, making it financially less worthwhile for landowners to cede some of their land for flood storage.

### Raising and Strengthening Levees

Raising levees requires increasing the width of the levee base. This configuration can result in the loss of habitat and, if on the river side, public access for fishing and recreation. Agency representatives stated that, from a Federal regulatory perspective, a CWA 404(b)(1) alternatives analysis and the ESA would generally favor a landward encroachment for levee improvements, but this situation presents local land use conflicts and possible economic costs to private landowners. It was commented that finding ways to reconcile this problem and to integrate ecosystem restoration into these structural measures is one of the objectives of the Comprehensive Study. Raising levees can produce system-wide hydraulic impacts, such as increased flows downstream and associated streambank erosion and loss of habitat, which may require structural or financial mitigation, thus adding to the overall economic cost of the project. It was also pointed out that raising levees, as compared to other non-structural measures for flood damage reduction, will require ongoing O & M funding to ensure protection which the Federal and State governments may be unable to provide.

### Upstream Storage

Upstream storage is achieved by constructing reservoirs in mountains and foothills as opposed to increasing floodplain capacity. The most effective measures to achieve flood management and ecosystem restoration are desired by the Comprehensive Study team. Two key factors favor non-structural solutions: (1) dams and reservoirs have many varied environmental impacts; and (2) current Federal policy emphasizes reliance on floodplain protection and non-structural measures (e.g., Executive Order 11988). However, the Federal P&G evaluation process can delay implementing non-structural measures because there is no clear method or mechanism for evaluating environmental benefits. Incremental project-by-project evaluations cannot adequately account for system-wide, regional benefits.

### Re-operating Existing Facilities

Management actions to reduce flood damage must take into account other beneficial

uses associated with the project, such as downstream water supply, hydroelectric power production, and habitat values. One possible option to offset a loss of downstream water supply is to release water specifically for ground water banking and conjunctive use programs.

#### Restricting Future Urban Growth In the Floodplain

Reserving land for floodplain storage by restricting urban growth represents a major flood damage reduction measure. This issue—land use—is a local decision, and such choices rest entirely within the region at risk.

#### **Future Steps**

This policy meeting was the first of two follow-ups to better define problems and discuss feasible options and impediments to implementation. The topic of the second follow-up meeting will be Flood Risk and Hydraulic Effects. This meeting is scheduled for early September. A working group will be established to further discuss the Corps Planning Process and NED.

Upon completion of these meetings, draft problem statements will be prepared and distributed for review and comment to all participants. In addition, a periodic newsletter from the Comprehensive Study team is planned for distribution later this year.



## **Sacramento and San Joaquin River Basins Comprehensive Study**

### **Policy Focus Group Meeting Flood Risk and Hydraulic Effects**

**Meeting Date and Time:** September 2, 1998  
1:00-5:00 P.M.

**Location:** U.S. Army Corps of Engineers  
1325 J Street  
Sacramento, CA

### **Abstract**

The U.S. Army Corps of Engineers and the Department of Water Resources/The Reclamation Board conducted a policy focus group meeting to solicit stakeholder input for the Sacramento and San Joaquin River Basins Comprehensive Study on the subject of flood risk/floodplain designations and hydraulic effects. Insights into institutional and policy problems to be addressed in the Comprehensive Study, and some ideas for change were:

- A comprehensive flood risk reduction plan for the region should incorporate the premise that rivers and floodplains are not merely conveyance and storage facilities but they are natural systems with varied values. This premise is essential to maintain the participation of all stakeholders.
- A fundamental debate in a comprehensive flood risk reduction plan relates to what role on-stream storage will play. Without additional on-stream storage, extensive modification to the existing conveyance infrastructure will be needed to increase flood protection while integrating ecosystem restoration.
- A system-wide approach is needed to implement a comprehensive solution to flood damage reduction and ecosystem restoration. This system-wide approach should not be constrained by incremental project-by-project evaluations and justifications. This necessity pertains directly to separate National Economic Development (NED) cost-benefit and hydraulic impact analyses associated with discrete components of a comprehensive solution. The cost and time involved with a “separable elements” approach are prohibitive. Impacts and benefits of a comprehensive solution should be evaluated using a long-term perspective. Short-term and geographically-specific impacts may exist in the context of the implementation of a broader, regionally-beneficial solution.

- While a system-wide approach is being developed, it is essential to establish a working policy consensus to evaluate and mitigate incremental build-out impacts.
- Integrating ecosystem restoration into flood damage reduction measures may result in a loss of conveyance system capacity. The question is whether this loss will require hydraulic mitigation since this project component provides a regional environmental benefit. Recent projects reviewed by The Reclamation Board that have hydraulic impacts due to ecosystem restoration have been qualitatively justified (and exempted from hydraulic mitigation), because non-native vegetation will be replaced by native vegetation.

## **Meeting Proceedings**

### **Introductions and Background**

Mike Bonner, U.S. Army Corps of Engineers (Corps), welcomed the attendees and stated that Susan Ramos has moved to the Bureau of Reclamation. He is now the project manager for the Corps' contingent on the Comprehensive Study Team. Mr. Bonner re-emphasized that he wants these meetings to be informal and interactive and to provide a frank exchange of ideas and concerns. He asked that participants introduce themselves, indicate what they want their role to be, and how they could contribute most effectively; he then asked them to comment on whether they believe the appropriate participants are included to help shape the direction of the study. Steve Yaeger from the Department of Water Resources (DWR) noted that many experts from the State were participating in the meeting to offer a valuable resource.

Mr. Bonner next provided a recap of the overall policy focus group process. As an integral part of the Comprehensive Study, the Corps, The Reclamation Board, and DWR are conducting policy focus group meetings to meet with stakeholders to share ideas on how to address policy and regulatory conflicts associated with implementation of flood damage reduction and ecosystem restoration measures. During the initial outreach meeting, held on June 30, 1998, a list of policy issues and institutional barriers was identified. On August 18, 1998, a follow-up policy focus group meeting was conducted on the topic of Ecosystem Restoration, Flood Damage Reduction, and the Regulatory Process. The purpose of this meeting was to clarify and refine the problems and potential corrective measures related to flood risk/floodplain delineations and hydraulic effects that were introduced at the June 30th meeting. The meeting facilitators focused on (1) defining problems related to existing approaches and processes to identify and manage flood risk, and to deal with hydraulic effects; (2) evaluating the effect of existing policies on implementing a comprehensive solution; and

(3) identifying the need for additional information.

Mr. Bonner indicated that a working group will also be established to further discuss the Corps Planning Process and National Economic Development (NED) evaluations. Summaries of the June 30, 1998 and August 18, 1998 meetings have been distributed. The Comprehensive Study Team requested feedback on their accuracy. Upon completion of all meetings, a full set of meeting summaries and draft problem statements will be sent to all participants. Mr. Bonner also stated that plans for a periodic Comprehensive Study newsletter are underway, and that distribution of the newsletter should begin this autumn to update all participants.

Mr. Bonner responded to a question as to what stage the Comprehensive Study team has reached; he noted that the timeline and project flow are subject to change. According to the current schedule, the goal is to prepare a final report to Congress and a programmatic EIS/EIR by 2002. The final report must outline and map a master plan using a system-wide approach to implement measures for flood damage reduction and integrated ecosystem restoration. The report must address the need for phasing of measures and specify immediate measures that can be approved and implemented. In addition, the report should describe policy/regulatory issues that affect implementation and make recommendations on potential necessary changes.

By April 1999, an Interim Report on the first phase of the study should be completed. This report will include information on problems in the basin; policy/regulatory issues and constraints; planning objectives; and conceptual measures derived from meetings for the purposes of technical support, policy focus, and working groups. The Interim Report will also include a status on hydrology and hydraulics models. As part of this study process, a Post Flood Assessment of system performance and damage estimates from the 1997-98 storms is also scheduled to be completed in April 1999. Mr. Bonner commented that, at this point, no measures are being precluded, but the emphasis is on what can be done to improve flood protection and incorporate ecosystem restoration into the existing system infrastructure. It was suggested by the group that the study should include measures to reduce runoff in both the upper and lower watersheds.

One of the participants commented that, from their perspective, a fundamental issue to be resolved by the Comprehensive Study involves the role of on-stream storage. Without additional on-stream storage, extensive modification to the existing conveyance infrastructure will be necessary to increase flood protection while also integrating ecosystem restoration.

## **Flood Risk - Floodplain Delineations**

Ron Milligan, a Corps team member on the Comprehensive Study Team, began the discussion with brief introductory comments on the different methods used to delineate

floodplains, why those methods exist, and how these delineations are used in the assessment of flood risk and in project planning. Mr. Milligan indicated that representatives from the Federal Emergency Management Agency (FEMA) were, unfortunately, unable to attend today's meeting, but that Andy Lee from the State Department of Water Resources, Division of Flood Management (the State coordinator for the National Flood Insurance Program [NFIP]), could assist in explaining the FEMA mapping approach and how that approach relates to the NFIP.

Mr. Milligan stated that there are different methods to delineate the floodplain because of different mapping purposes or agency missions. Many times the Corps prepares floodplain mapping to conduct economic evaluations on projects for flood damage protection. Historically, the Corps' practice for these evaluations was to map using flow-frequency curves adjusted for expected probability, which would provide a safety factor in project design to account for uncertainty due to limited hydrologic records. In contrast, FEMA performs floodplain mapping in order to assess insurance risk. FEMA uses a computed or normal probability approach which is neutral to uncertainty in the hydrologic record. FEMA mapping also uses existing conditions, not future conditions with "build-out,"<sup>1</sup> whereas the Corps has always incorporated future conditions in their mapping. It was noted that these contrasting approaches by these two Federal agencies create problems with communication of actual flood risk to the public and with local agency management of risk and land use.

Mr. Milligan indicated that the Corps has now started to move away from formulating and evaluating projects using flow-frequency curves which are adjusted to include expected probability and designed freeboard. The Corps has begun to use a risk-based methodology which accounts for uncertainties associated with hydrologic, hydraulic, geotechnical, and economic data used in project design. Representatives from local flood management districts expressed concern about this change. From their perspective, flood protection planning got "off-track" with the FEMA insurance program. FEMA mapping was developed to serve the insurance program. It has now extended well beyond the originally intended use, and has become a planning tool for land use. Local flood control district representatives stated that there is more to flood management planning than meeting FEMA minimum requirements. They advocate looking at the value of what needs to be protected, and then design and fund accordingly: if urban, provide 200-year protection; if farmland, provide 50-year protection. They thought that using the standard project flood approach, which takes an historic event and adds 20-30 percent, was a reliable approach used in the past. Project designers should avoid the statistical game of quoting levels of protection.

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<sup>1</sup> It was noted by one of the participants that FEMA's justification for using existing conditions only, is to keep flood insurance rates low, but this approach was questioned, given the fact that so many policies are Federally subsidized.

The group next discussed the public's perception of risk, and how floodplain maps should be used by local government planners. It was generally agreed that the public perception is one of safety as long as a house is behind a levee. It was noted that, in fact, there exists residual risk in such a situation. It is vital to know the strength of the levee, the likelihood of failure, and the extent of inundation if the levee fails. For an accurate evaluation of localized risk, mapping of areas behind the levee should be performed. Flood managers pointed out that the 100-year floodplain may not be an adequate measure of risk. Different locations within the 100-year floodplain may have different levels of risk: some areas within the delineated floodplain may be subject to one foot of sheet flow, while other areas may experience deep flooding. The participants agreed that public awareness of floodplain risk is essential to an informed public debate of floodplain delineations and flood risk.

The topic proceeded to the use of floodplain maps by local government to make land use decisions. According to participants, the risk of being flooded seems to be the most obvious public concern. The answer to this issue is not simple. It was suggested that both the FEMA 100-year floodplain map and the standard project flood map be used. (In the absence of a unified method to assess flood risk, The Reclamation Board uses this method to determine sizing/effect of projects.) For purposes of "informed" land use planning, local governments should consider two issues: (1) in terms of the actual risk of flooding, there is a nebulous area that exists between the two mapped designations; any development occurring in that zone could be at risk in the future; and (2) there are different levels of risk that exist within the 100-year floodplain. Planners need to work with the public to decide what is an acceptable level of risk for each community and accordingly develop land use and local flood policy. Another participant, however, pointed out that the public really doesn't care about flooding and that there is not much grassroots support for careful, pro-active flood protection planning. The general public and their elected representatives resent Federal and State involvement in land use planning. However, when flooding occurs, the public wants the Federal and State agencies to rescue them.

To summarize the discussion on flood risk and floodplain delineations, participants in the group were asked: (1) What do they see as the objectives of floodplain mapping? (2) How do we want to use the maps? (3) What is the importance of designating a floodplain? (4) How are differing mapping methods a problem to your agency or organization? Responses were as follows:

- Floodplain mapping and project design are separate. Project design does not require a reconciliation of mapping methods. The mapped 100-year floodplain may not adequately convey risk and the project design may cover a higher or lower level of protection.

An alternative view was that project design and floodplain designations cannot be separated because the public must vote on bonds to finance flood protection. Flood

risk to each community is public information necessary for an informed voter.

- Floodplain designations, in many cases, cannot be defended because historical data are not archived. As a result, regardless of delineation method, there is a critical need for ongoing data collection as well as maintenance and updating of baseline floodplain maps.
- Agencies may seek too much precision which is of doubtful utility in mapping. The bottom line is that, as incremental build-out occurs, more water needs to be carried through the system and conveyance capacity needs improvement.
- Floodplain designations should not control land use decisions. Land use decisions (i.e., general plans, zoning) should be made first, then protection should be provided.

An alternative view was that not all general plans integrate enough open space and wetland storage. For the regional system to be sustainable and achieve some “balance,” more on-site detention is essential.

- Flood control projects have an impact on land use and land use conversion by encouraging growth in areas that have protection, which, in turn, leads to floodplain storage loss, open space loss, and habitat loss. Floodplains have multiple values; as such, existing policies and approaches to flood protection planning may not adequately recognize and protect these multiple values.

## **Hydraulic Effects**

Tim Washburn from the Sacramento Area Flood Control Agency (SAFCA) offered some introductory comments and background on hydraulic effects to help the group to understand this subject and its key issues. Mr. Washburn explained that on-stream storage projects avoid the issue of hydraulic effects. Conversely, conveyance system solutions to flood management will likely have hydraulic effects: if areas in the system where overbank storage once occurred are eliminated, more water is likely to be sent downstream or create upstream flooding. He described three examples of contexts of hydraulic effects that SAFCA has been involved with:

- Increasing protection by levee raising in the southern portion of the City of Sacramento has resulted in an increase in flows downstream to Point Pleasant, and an increase in the frequency of flooding between Sacramento and San Joaquin Counties. The issues that SAFCA faced were: what should be done to mitigate increased incremental risk downstream, and what increment of increase constitutes a significant, mitigatable risk?

- Protecting lowlands can also create hydraulic impacts in upstream areas because of flow backup. The issue in this context is how does one account for loss of freeboard and is there an impact related to loss of freeboard in conveyance systems. Also, at what point is an impact significant? The difference between 3 feet v. 1 foot of freeboard could translate to a reduction in protection from a 500-year to a 100-year flood event. The Reclamation Board policy is that, if upstream hydraulic effects will likely occur, upstream property should be protected with structural protection, even if the cost of protection exceeds the value of effected property. SAFCA's position was that they would rather provide insurance against any additional flood risk.
- Increasing flood protection by raising levees along the American River will likely result in an increase in flows into the Yolo Bypass. The Corps has stated, however, that implementation of any additional flood protection measures cannot increase flood flows downstream. The problem here is how to achieve increase in protection along the Lower American River, using the proposed modifications to existing storage and conveyance infrastructure, if the net result is an increase in flows or frequency of flooding downstream.

The group discussed the fact that there are no consistent Federal, State, or local standards to identify and evaluate hydraulic impacts and mitigation associated with alternative flood damage reduction measures. This deficiency is crucial because the inclusion of the hydraulic mitigation cost in a flood management project can increase the cost so significantly as to make the project economically infeasible compared to the value of the property or resource being protected by the incremental increase in protection. Currently, there is only a hodgepodge of ad hoc, project-by-project rulings which encumbers a comparative evaluation of alternative plans.

Representatives from The Reclamation Board indicated that State regulations stipulate that the State require mitigation for increased hydraulic impacts, but no significance criteria have been established.<sup>2</sup> The Reclamation Board policy has been to ensure zero impact or no-net-loss of protection in the 100-year regulated floodplain. According to Reclamation Board participants, this policy has been modified in some situations based on the type of property that would experience an increased flood risk (e.g., is mitigation necessary if agricultural land is subject to increased risk?). Reclamation Board participants indicated that the State needs to request that the Corps promulgate a Federal policy on hydraulic impacts. Currently, the Federal/Corps policy criteria would most likely be a test of the Fifth Amendment of the U. S.

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<sup>2</sup> This lack of criteria for mitigation ties in directly to the California Environmental Quality Act (CEQA) analysis of projects wherein any increase in flood risk must be evaluated and determined to be a significant impact or not.

Constitution, also known as the Takings Clause (uncompensated taking of property).

The question that The Reclamation Board must regularly confront is “Should the State participate in or fund projects, if certain areas are protected, but if other areas experience an incremental increase in flood risk?” Participants noted that this issue directly relates to the issue of a comprehensive, system-wide approach versus the approach of project-by-project, separable elements. The Comprehensive Study will, at some point, contain policy recommendations to address this issue.

In conclusion, it was commented that if on-stream storage is not going to be a flood damage reduction measure, conveyance system improvements must likely incorporate additional valley floor storage. Furthermore, if a comprehensive solution accounts for impacts from conveyance system improvements, the evaluative process must begin at Suisun Bay and work upstream to the Sierra Nevada. For the system to be balanced, some areas in the system may gain protection and some may lose protection.

## **Themes**

The following themes surfaced during the discussion. They provide valuable insights into institutional and policy problems that will be addressed in the Comprehensive Study.

- A comprehensive flood risk reduction plan for the region must incorporate the premise that rivers and floodplains are not merely conveyance and storage facilities, but are natural systems with varied values. This premise is essential to maintain the participation of all stakeholders.
- The fundamental debate in a comprehensive flood risk reduction plan relates to the role of on-stream storage. Without additional on-stream storage, extensive modification to the existing conveyance infrastructure will be needed in order to increase flood protection while integrating ecosystem restoration.
- To implement a comprehensive solution to flood damage reduction and ecosystem restoration, a system-wide approach is needed, one which is not constrained by incremental project-by-project evaluations and justifications. This approach pertains directly to separate NED cost-benefit and hydraulic impact analyses associated with discrete components of a comprehensive solution. The cost and time involved in a “separable elements” approach will be prohibitive. Impacts and benefits of a comprehensive solution must be evaluated using a long-term perspective. Short-term and geographically-specific impacts may exist in the context of the implementation of a broader, regionally-beneficial solution.



- While a system-wide approach is being developed, it is essential to establish a working policy consensus on evaluating and mitigating incremental build-out impacts.
- Integrating ecosystem restoration into flood damage reduction measures may result in a loss of conveyance system capacity. The question is whether this loss will require hydraulic mitigation since the project provides a regional environmental benefit. Recent projects reviewed by The Reclamation Board that have hydraulic impacts due to ecosystem restoration have been qualitatively justified (and exempted from hydraulic mitigation), because non-native vegetation would be replaced by native vegetation.

## **Next Steps**

This meeting was the second of two follow-ups to better define policy problems and to identify possible options and their constraints. To solicit stakeholder input, a working group will be established to further discuss the Corps Planning Process and NED.

Upon completion of the working group meetings, draft problem statements will be prepared and distributed for review and comment to all participants. Where appropriate, possible ideas on potential solutions to problems will be included. At that same time, the full set of meeting summaries will also be distributed. These steps are intended to ensure that ideas expressed by stakeholders are properly represented.



## **Sacramento and San Joaquin River Basins Comprehensive Study**

### **Corps and State Planning/Project Development Processes (Including NED) Working Group Meeting**

**Meeting Date and Time:**     October 29, 1998  
  8:30 A.M.-12:00 P.M.

**Location:**        State Resources Building  
                          1416 Ninth Street, Room 1412  
                          Sacramento, CA

#### **Abstract**

The U.S. Army Corps of Engineers and the Department of Water Resources/The Reclamation Board conducted a working group meeting to solicit stakeholder input for the Sacramento and San Joaquin River Basins Comprehensive Study. The meeting entailed a roundtable discussion of the problems and issues associated with Federal and State policies concerning the development and implementation of projects intended to meet multiple objectives in a watershed or ecosystem context. Important insights into institutional and policy problems and some ideas for change were:

- The U.S. Army Corps of Engineers (Corps) Planning Principles and Guidelines (P&G) are intended to serve as general recommended guidance, rather than as requirements, in order to provide for field discretion and latitude on the part of the informed planner. This distinction is understood at Corps management levels, but not necessarily by its staff.
- Ecosystem restoration is a priority mission for the Corps; such restoration is an integral part of multi-purpose projects. Planning objectives must ensure that a cost-share will be applied to the total project. In most traditional National Economic Development (NED) evaluations, the economic value of ecosystem restoration has not been clearly calculated and quantified and has, therefore, been difficult to include in the Benefit/Cost ratio.
- Project planning objectives should be established first. The plan and the partnerships should then be developed.
- Flood protection is The Reclamation Board's primary mission. For projects that contain ecosystem restoration and other elements, a clear link with flood protection must be proven. The Reclamation Board currently has no authority to

request appropriations for staffing, study, or construction for other than flood management projects. This lack of authority must be rectified by changes in State statute.

- Strategies for successful approval of the Comprehensive Study were identified. The example of the Clean Water Action Plan offers positive guidance: watersheds are the appropriate planning scale, ecosystem restoration is of national importance, and partnerships are powerful catalysts.

## **Meeting Proceedings**

### **Introduction and Background**

Mike Bonner, U.S. Army Corps of Engineers (Corps), welcomed the group, thanked them for participating, and provided an overview of the Comprehensive Study. He stated that, as a result of the January 1997 flood event, in which approximately 27 levee breaches occurred, the Governor mandated that representatives of State agencies produce the Flood Emergency Action Team (FEAT) report. This report evaluated existing flood management facilities and emergency agency responses. It also listed recommendations to reduce impacts from future flood events. The FEAT report was sent to Congress requesting enactment of legislation to comprehensively evaluate the flood management system in the Sacramento and San Joaquin River basins, and to identify opportunities to incorporate ecosystem restoration. The 1998 Federal Energy and Water Development Appropriations Act provided authorization and funding for the Comprehensive Study.

The purpose of the study is to identify potential structural and non-structural flood damage reduction measures and potential ecosystem restoration measures; develop resource data bases, criteria for screening measures, and hydrologic/hydraulic models of the two river systems; and to define opportunities and plan elements that are immediately implementable. Phase I began in October 1997 and culminates in April 1999 with publication of the Phase I Interim Report which will provide a status of the study effort and a final Post Flood Assessment. The Final Report on the Comprehensive Study is due in September 2002.

Mr. Bonner reviewed the stakeholder involvement and outreach efforts to solicit input on policy and regulatory issues as well as institutional roadblocks to implementation of flood damage reduction and ecosystem restoration measures. This process included an initial meeting on June 30, 1998, with Dr. Gerald Galloway as the keynote speaker, to define policy issues and institutional barriers. This meeting was followed by a second policy focus group meeting August 18 on Ecosystem Restoration, Flood Damage Reduction, and the Regulatory Process. A third meeting was held September 2 on Flood Risk and Hydraulic Effects. Today's meeting concludes this initial phase of stakeholder involvement.

Mr. Steve Yaeger, The Reclamation Board, explained that measures contained in the Comprehensive Study will be very difficult to implement without policy changes and streamlining. Of key importance to local sponsors are cost allocation and, specifically, how to incorporate ecosystem restoration in flood management projects without shifting these costs to the non-Federal party. Mr. George Qualley, State Department of Water Resources, added that the roadblocks may not be the policies themselves, but the interpretation of the policy, and that modifications to administrative procedures may be the necessary corrective.

Mr. Rick Dreher, Corps, reviewed the meeting handout. This material describes problems and issues related to Corps and State Policies. The discussion focused primarily on Principles and Guidelines, National Economic Development (NED) evaluations and ecosystem restoration, State policies and concerns, and strategies for the Comprehensive Study.

### **Principles and Guidelines**

The Corps' planning guidance has various sources. National policy is passed by the Congress, and is stated by the Administration in legislation, Federal rules and regulations, and Executive Orders, as well as in the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, also known as the Principles and Guidelines (P&G).

Corps representatives stated that the P&G are intended for recommended general guidance, rather than requirements, in order to provide for field discretion and latitude on the part of the informed planner. It was further explained that NED benefit evaluation is an important aspect of P&G for water resources planning. Demonstrating a NED plan in the evaluation indicates Federal involvement, and Congressional policy is to achieve a benefit/cost (B/C) ratio of higher than 1. Because of Congress's policy on a B/C ratio, the Corps will continue to use the B/C ratio.

Representatives from HQUSACE pointed out, however, that when funding for the Comprehensive Study was approved in Washington, D.C., there was no intention that it would be NED-based; instead, it was intended that it would incorporate new approaches and be a comprehensive, multi-objective, integrative plan developed and implemented in a partnership with multiple stakeholders. (As an aside, it was noted that existing, incrementally-justified NED projects in the two river basins did not work as a unitary, integrated system in the 1997 floods, which highlights some of the constraints on the traditional application of NED and overall B/C ratios.) The stage has been set by Challenge 21, which acknowledged the need for change in the traditional approach under P&G, to balance multiple objectives in projects and achieve a blend of outputs, including ecosystem restoration, not just flood control. In most traditional NED evaluations, the economic value of ecosystem restoration cannot be clearly calculated and quantified and is, therefore, difficult to include in the B/C ratio. It was further stated that some projects have been approved that have not been NED-justified and it is just as possible to do a

NED-project as a non-NED project. The problem is not with P&G and NED—when only limited funding is available, the emphasis is placed on the traditional areas of Corps authority which are navigation and flood control. In fact, in the 1999 appropriations bill, there was a reminder to the Corps to remain focused on its primary mission of navigation and flood control, and a clear message that just because a project has environmental benefits does not necessarily mean that the Federal government should pay it.

Other participants commented that the Corps needs to help ensure that staff understand that the P&G is just guidance, and not rules, and that discretion does exist. This seems to be understood at management levels today, but not necessarily by staff. Some also commented that many times project decisions seem to be coming from regulations, not planning guidance, and this is conveyed by staff. In response, HQUSACE representatives described that there are different layers of regulations and guidelines: Federal law, engineering regulations published in the Federal Register, engineering regulations not published in the Federal Register (administrative only), and policy guidance letters. Engineering regulations represent rules and codify guidance, but only engineering regulations published in the Federal Register have enforceability—if staff is using these engineering regulations, the flexibility is generally gone. Publication in the Federal Register is strategically done for this reason. Cutting-edge policy is typically issued in policy guidance letters to set the stage for engineering regulations. The Comprehensive Study will likely fall under the purview of administrative engineering regulations and policy guidance letters.

## **NED Evaluations and Ecosystem Restoration**

The Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements.

Corps representatives stated that NED evaluations are used to determine a reasonable cost-share for projects. Many times local sponsors have great plans, but these plans may not warrant commitment of Federal dollars. Use of NED is primarily to demonstrate that a Federal interest exists and that the project is a wise investment of Federal money. The fact is that most decision-makers focus first on the cost-share being proposed and then review the details and merits of the project. NED is not intended to stop projects and, when cost-sharing is not an issue, the B/C ratio and the NED plan do not need to be the most important considerations.

According to HQUSACE representatives, now that ecosystem restoration is a high priority mission, it is essential to present ecosystem restoration as an integral part of multi-purpose projects and clearly state that in the planning objectives—that way the cost-share will be applied to the total project. Conversely, if the process starts with a NED project and then ecosystem restoration is “tacked-on” to try to justify a locally-preferred project, the Federal cost

share will all be allocated to flood control. Ecosystem restoration measures will get NED credit if they have a flood control benefit and, therefore, it is best to show that a feature has dual outputs of flood control and restoration. Representatives pointed out that it is essential to explain why restoration is an integral element in the project and why the resource is of Federal interest—Is it critical habitat? Is it an important link in the National Wildlife Plan? Is it important at the national scale, not just the local scale? The District Engineer can approve variances for projects with restoration and flexibility in P&G allows for trade-offs between flood control and restoration benefits, but there is no established way to do this.

It was recommended by Corps representatives that planning objectives be established first, then develop the plan and the partnerships. It is important to have good communication early on at all levels in the partnership, including with those reviewing the plan, to determine what alternatives will be pursued and how detailed the NED analysis will be for the alternatives—particularly those alternatives that will not be recommended. This scoping and consensus-building on planning objectives is critical. HQUSACE representatives said that different levels of Micro-Computer Aided Cost Estimating System (MCACES) analyses will be allowed for the evaluation of alternatives, particularly in the preliminary iterative stages. It was also strongly recommended that “you need to tell your story”—technical data is not enough, you need to make a compelling case and sell it; you can’t just state that it is the locally-preferred plan and assume that the benefits will be apparent and Federally-funded. In preparing the plan document, use planners that know how to communicate well and have a good command of the English language. According to a representative from the Institute for Water Resources, Congress says “don’t get hung-up on NED justification—look for benefits to the Nation’s environment.” As an example, \$7.5 billion was just appropriated to the Everglades Restoration Project without substantial demonstrated NED benefit. The process simply demands that you use a rational, systematic method to show sensible results—no need to maximize NED outputs. The Everglades project also succeeded because there was something for everyone, but no one got everything.

One of the participants asked, if ecosystem restoration is included as part of a flood control project, could the cost of the flood control project be reduced by the cost for ecosystem restoration and the project become more economically feasible? Corps representatives again responded that the restoration must be an integral part of the flood control project, with one contributing to the successful functioning of the other, and included in the project objectives. The best approach is to try to get both flood control and ecosystem restoration cost-shared to the greatest extent. But, there is still little guidance on how to allocate costs among the different component parts of the project. The Corps is now wrestling with this issue. The Separable Cost Remainder Benefit (SCRB) method was formerly used for multiple-objective projects as a way to allocate costs when the output of that cost met multiple project objectives. There may be a renewed role for SCRB to accommodate ecosystem restoration valuations.

It was also asked if “enhancement” elements of a project could reduce local costs. An enhancement under PL 89-72 is a project component that entirely benefits a special environmental resource, such as a Federally-listed endangered species. If all the cost is directly related to an enhancement element, the Federal cost-sharing is 100%. HQUSACE responded that it’s difficult to find a project that totally benefits one resource under enhancement guidelines.

The last item discussed under this topic was the fact that Federal law does not contain a clear definition of what is a non-structural, non-traditional flood damage reduction measure (though the Federal *Digest of Water Resources Policies and Authorities* apparently contains definitions). HQUSACE representatives suggested that the Comprehensive Study Team will need to provide some of their own clarification and resolution to this in order to arrive at cost-share recommendations. Currently, only structural projects have established cost share methods. Generally, structural projects involve directly controlling water flows. Non-structural projects entail other measures to reduce damage and may, in fact, involve construction (such as relocating people and razing houses), but not to control water flows—to manage people’s response to water. Also, a plan can be considered non-structural, even if it has structural elements (hard points). These distinctions may get legislatively changed at the Federal level in the next water resources development act and the distinction between the two types of projects may be lessened.

## **State Policies and Concerns**

Representatives from The Reclamation Board stated that their primary mission is flood control and, on projects where ecosystem restoration is integral to flood control, they have authority to perform such restoration. The Reclamation Board does not, however, have the authority to do ecosystem restoration in conjunction with Federally authorized flood-control projects unless a clear nexus exists. For projects that contain ecosystem restoration and other elements, The Reclamation Board currently has no authority to request appropriations for staffing, study, or construction for other than flood control projects. It was suggested that this probably needs to be addressed by changes in State statute, initiated by the Governor. If The Reclamation Board had expanded authority and a clear environmental mission, the Corps could potentially work with one non-Federal, State partner rather than several. The Reclamation Board is the one State agency that could fill the State role for flood control and ecosystem restoration. With the additional authority, the State could take over the entire non-Federal share of multi-objective projects, and the Corps would not have to deal with different State and local agencies—The Reclamation Board could broker projects between the Corps and local sponsors. This would make the process much easier for the Corps.

This is particularly important because ecosystem restoration will be an integral part of the flood control planning, including capacity planning, to be addressed in the Comprehensive Study. Establishing a clear authority on the part of The Reclamation Board should be addressed before the Final Report is submitted (September 2002).



There was a discussion concerning the Corps' position on Federal reimbursements (i.e., when local agencies move forward without Congressional authorization on projects and then seek reimbursement). There is some provision in the 1996 Water Resources Development Act, but no clear guidance. The Office of Management and Budget takes a dim view of reimbursement arrangements, and there may be internal Corps resistance to serving as a conduit for funding local efforts. Additionally, Congressional committees may resist reimbursement arrangements because they take away committee prerogatives. It was recommended that local agencies try to secure Congressional authorization before initiating the project, regardless of who ultimately does the work. That way, the Corps could determine that the local project qualifies as a "certified" Corps project, allowing the local agency to go forward without waiting for the Corps and know that funding will be eventually provided by the Federal government.

### **Strategies for the Comprehensive Study**

Throughout the roundtable discussion, strategies for the successful approval and implementation of the Comprehensive Study were suggested. These are recapped below.

- Establish and get consensus on the planning objectives for the Comprehensive Study; this needs to occur between the Governor, the District Chief Engineer, Division staff, and HQUSACE; it needs to be clear that this is multi-objective plan balancing flood protection with ecosystem restoration.
- Develop a system-wide vision—then figure out the alternatives and funding and local cost share; don't let sources of funding drive development of the plan.
- "Bubble up" the message to both Federal and State agency management on the need for change (i.e., level of NED analysis of alternatives, assigning economic value to environmental benefits, balancing flood control and ecosystem restoration, achieving a blend of outputs in the plan).
- Set up a policy review group in Washington, D.C. to build "buy-in" on the approach underpinning the Comprehensive Study. It was suggested that Mr. James Johnson, the new Head of HQUSACE Planning, could be instrumental in setting up this policy review group. (This step will be important to bolster State agencies [i.e., The Reclamation Board] in going to the Governor to request changes in agency authority.)
- Start thinking about a preview process with the involved agencies before the Phase I Report summary goes to Congress.

It was pointed out by one of the participants that there is no longer a Central Valley congressman on the Appropriations Committee and the Comprehensive Study Team should not depend on someone “fighting the project through Congress.” The Team will need to:

- develop a quality plan using “new” planning principles,
- emphasize floodplain function and open space values,
- identify restoration objectives and resources that have regional and national value,
- put forth a rational, systematic approach for economic evaluation and B/C analysis for non-structural, non-traditional elements,
- perform good trade-off analysis trying to identify the optimum trade-off between flood control and restoration, and
- demonstrate that all the stakeholders are contributing something to the solution.

It was suggested by representatives from HQUSACE that the “guiding light” for the Comprehensive Study Team should be to follow the example of the Clean Water Action Plan—watersheds are the appropriate planning scale, restoration is of national importance and should be emphasized, and partnerships make things happen. The Comprehensive Study Team was also encouraged to link into Category I watersheds in California. The list was just published and Section 319 funding is available for Category I watershed work—this is the focus of EPA and other agencies.

# **Sacramento and San Joaquin River Basins Comprehensive Study Local Support Discussions SUMMARY December 1998**

## **Project Background**

In response to the floods of January 1997 and the recurring flood threat in California's Central Valley, the U.S. Army Corps of Engineers and The Reclamation Board of the State of California are leading a basin-wide assessment to improve flood management and integrate ecosystem restoration throughout the Sacramento and San Joaquin River basins. This Comprehensive Study will initially identify opportunities, planning objectives, constraints, and measures to address flooding and ecosystem problems in the study area. The study will ultimately develop a system-wide master plan for flood damage reduction and integrated ecosystem restoration, as well as identify projects for early implementation, for each basin.

## **Comprehensive Study Area**

The study area is the combined watershed of the two major river systems of California's vast Central Valley: the Sacramento River and the San Joaquin River. These river systems have a combined drainage area of over 41,000 square miles. Major cities in the study area include: Sacramento, Stockton, Modesto, Fresno, Merced, Redding, Yuba City, Marysville, Chico, Colusa, Red Bluff, and Manteca.

## **Why Conduct Local Support Discussions?**

Since the Comprehensive Study's inception, public awareness and involvement have been key components of the planning process. Given the complexities of the flood management system in the Central Valley, the project team decided to conduct focus group research in February 1998 to help identify issues and constraints in connection with the Sacramento and San Joaquin Rivers. The results of this research focused team efforts on those areas of most concern. The information also helped to identify on-going and proposed projects to include in the Comprehensive Study.

## **Meetings**

Ten local support discussions were conducted at various locations in the Central Valley between November and December of 1998. The purpose of these small regional meetings was to inform affected stakeholders of the Comprehensive Study and to solicit their concurrence with the

problem statements, objectives, and categories of proposed measures. The meetings were informal and encouraged open dialogue and feedback.

## **Participants**

The Department of Water Resources invited over 200 local experts and stakeholders to participate in the discussions based on their experience in flood management. Each meeting was designed to include a broad, diverse interest group promote interaction from all points of view. Staff members from local legislators and district Congressional offices were also invited.

## **Summary of Issues**

Many issues and concerns were raised at each of these meetings. The following is a list of those issues arranged in random order.

- |   |   |
|---|---|
| ✓ Need to Establish Planning Goals      | ✓ Levee Composition & Integrity           |
| ✓ Cost-sharing                          | ✓ Accountability                          |
| ✓ Water Supply & Water Quality          | ✓ Stakeholder Involvement                 |
| ✓ Permit Problems                       | ✓ Study Area Expansion                    |
| ✓ Unequal Objectives                    | ✓ Navigation                              |
| ✓ Liability                             | ✓ Off-Site Mitigation                     |
| ✓ Public Involvement                    | ✓ Re-Operation of Dams                    |
| ✓ Unequal Flood Protection              | ✓ Economic Impacts                        |
| ✓ Erosion                               | ✓ Property Rights                         |
| ✓ Sedimentation                         | ✓ Vegetation Management                   |
| ✓ Water Storage                         | ✓ Project Management                      |
| ✓ Costs                                 | ✓ Maximize Opportunities                  |
| ✓ Realistic Goals                       | ✓ Model Maintenance                       |
| ✓ "Real" Projects vs. Studies           | ✓ Floodway Designations                   |
| ✓ Agency Conflicts                      | ✓ Interagency Coordination                |
| ✓ Easement Programs                     | ✓ Urban Runoff                            |
| ✓ Loss of Habitat                       | ✓ Exotic Species                          |
| ✓ FEMA Mapping                          | ✓ Hydraulic Mitigation                    |
| ✓ Relationship to Other Programs        | ✓ Project Delays                          |
| ✓ Project Integration                   | ✓ O&M Costs                               |
| ✓ Weir Debris                           | ✓ 3rd Party Impacts                       |
| ✓ Levee Seepage/Erosion                 | ✓ High Flows                              |
| ✓ Need for Immediate Action             | ✓ Back-Water Effects                      |
| ✓ Damages: Agricultural & Local         | ✓ Purchase of Private Lands by Government |
| ✓ Need for Master Plans with Priorities | ✓ Sub-Surface Runoff                      |
| ✓ Disaster Assistance                   | ✓ Energy Costs                            |
| ✓ Private Levees/Damages                |   |

## **General Findings**

- **There is steady support for a study that takes a system-wide approach to feasible solutions.**
- **Flood management is a crucial concern in the Central Valley.**
- **Meeting participants want to be actively involved in the development of comprehensive flood management master plans with integrated ecosystem restoration.**
- **The public expressed a desire for an outcome—a funded, feasible, implemented project rather than an ongoing study that remains merely a study.**



## **Sacramento and San Joaquin River Basins Comprehensive Study Local Support Group Discussions OVERVIEWS**

### **FRESNO MEETING OVERVIEW**

The Local Support Group meeting for the Fresno region of the Sacramento and San Joaquin River Basins Comprehensive Study was held on November 5, 1998; it was attended by 20 people. Participants voiced concerns regarding water shortage and supply issues in the Fresno region. Additional concerns included the following:

- **WATER SUPPLY:** Some participants commented that the Fresno area suffers from a severe water shortage. Therefore, if the Comprehensive Study Team is including ecosystem restoration in the study, it should include water supply and water quality elements as well. Some participants believed it would be difficult to address flood management without addressing these issues, and gain public acceptance.
- **ENVIRONMENTAL RESTORATION:** The Comprehensive Study must meet the requirements of the wildlife agencies and enthusiasts. However, this process becomes difficult without the examination of additional water storage.
- **PRIVATE PROPERTY RIGHTS:** Concerns were raised about protection of private property rights.
- **MAINTENANCE:** There were concerns regarding maintenance practices along the river. This issue should be addressed to prevent issues that may complicate and delay the Comprehensive Study. It was suggested that a summary report, which does not emphasize maintenance costs, would be deficient and would fail in future years.
- **ONGOING PROJECTS:** The participants were interested in the procedures for designating projects for early implementation.
- **MANAGEMENT OF MODELS:** Questions were raised regarding which agency is responsible for managing the models developed by the Comprehensive Study Team and if access to the models would be available to others.

## **MODESTO MEETING OVERVIEW**

The Local Support Group meeting for the Modesto region of the Sacramento and San Joaquin River Basins Comprehensive Study was held on November 6, 1998; it was attended by 26 people. The participants voiced questions and concerns about third party impacts. Additional concerns included the following:

- **REALISTIC GOALS:** There is concern that the Comprehensive Study should produce specific and realistic projects.
- **LOSS OF HABITAT:** Some meeting participants commented that the loss of habitat has caused problems and is an issue in this area.
- **LEVEE INTEGRITY:** Some meeting participants believe that the Comprehensive Study relates to the 100-year floodplain and it must be integrated with the existing information. It was suggested that levee integrity should be investigated in the area.

## **MERCED MEETING OVERVIEW**

The Local Support Group meeting for the Merced region of the Sacramento and San Joaquin River Basins Comprehensive Study was held on November 6, 1998; it was attended by 17 people. Participants voiced questions and concerns regarding implementation of the Comprehensive Study and how it can benefit their region. Additional concerns included the following:

- **PROGRESS:** The participants stated that they were appreciative of the project and want to be included in the entire process.
- **ACCOUNTABILITY:** The participants asked several questions regarding implementation of the Comprehensive Study and which agency and/or individual will be responsible and accountable.
- **APPROACH:** Participants commented that several studies have been performed on the Toulomne River and that the existing data should be incorporated into the study and examined from a “systems” viewpoint.
- **EXPAND CRITERIA:** Participants added that the Comprehensive Study Team should adopt a broader perspective because more run-off will be generated as urban growth develops. The team should consider current run-off and how extra flood flows from future urban growth will be handled.



- **FLOOD MANAGEMENT VS. ENVIRONMENTAL RESTORATION:** Some participants believed that the region will experience a greater demand for water resources. Export of water resources to the south should not be promoted within the Master Plans.
- **LEVEE MAINTENANCE:** This problem with the lower Merced levee system was discussed. This system should be examined because maintenance of many levees is a regional issue.
- **CHANNEL MAINTENANCE:** Concerns were raised regarding channel maintenance. It was suggested that this issue be addressed in the Comprehensive Study because of the expense for the disposal of materials removed from the channel. Agencies could consider using debris removed from the river for construction projects.

## **MARYSVILLE MEETING OVERVIEW**

The Local Support Group meeting of the Marysville area of the Sacramento and San Joaquin River Basins Comprehensive Study was held on November 12, 1998; it was attended by 16 people. Participants voiced questions and concerns regarding agriculture and the regional economy. Additional concerns included the following:

- **SEDIMENTATION:** Some participants believed the Comprehensive Study should examine hydraulic debris and mining debris from the Yuba River.
- **NAVIGATION:** Participants stated that the Feather River was once navigable. The river could be used for flood management if navigability is restored. The participants believed that opportunities may be missed if the Comprehensive Study does not consider navigability, which would provide an economical means of transportation and increase tourism for this region.
- **REGIONAL ECONOMICS:** Some participants stated that there is a perception that if something is good for the environment, then it is good for everyone. They think that the economic impacts of ecosystem restoration must be addressed because Marysville is an agriculturally based, but economically depressed, area. Local residents do not consider projects acceptable simply because they are good for the ecosystem and for flood management. Participants believed that when regions are kept flooded for long periods of time, the economy of that region is impacted.
- **TIMING OF COMPREHENSIVE STUDY:** Concerns were raised regarding the length of time to complete the Comprehensive Study. Participants believe they remain at risk during the study period.

- **OFF-SITE MITIGATION:** It was suggested that once a mitigation site is fully developed, local agencies should not be responsible for managing the site.
- **TEAM INFORMATION COLLECTION:** A participant suggested that a comprehensive questionnaire should be developed to communicate with district managers and ascertain their local flood concerns.

## **COLUSA MEETING OVERVIEW**

The Local Support Group meeting for the Colusa area of the Sacramento and San Joaquin River Basins Comprehensive Study was held on November 12, 1998; it was attended by 18 people. Participants asked questions and raised concerns regarding the condition of the levee system. Additional concerns included the following:

- **IMPLEMENTATION PROJECTS:** Participants raised questions about which specific projects will be recommended by the Comprehensive Study Team at the end of the study.
- **LEVEE INTEGRITY:** Some participants stated that their top priority is protection of their levee system.
- **OFF-STREAM STORAGE:** Participants believed that their problems originate in the west side of the county, but if Colusa possessed off-stream storage, the flooding from the west side might be alleviated.
- **MULTIPLE AGENCIES:** Participants wanted to know which agency will ultimately be in charge of the Master Plans after the Comprehensive Study is complete. They questioned how conflicts with programs like CALFED and CVPIA will be dealt with.
- **SEDIMENT/DEBRIS/EROSION:** Some participants were concerned about the effects of erosion on their riverbanks and downstream areas.
- **COST-SHARING:** There was a general concern that local districts are unable to provide a significant amount of funding toward improvements.
- **COLUSA BASIN FLOODING:** The level of the Sacramento River is a concern to some participants. They believe that this region needs reservoirs to store excess water. In addition, the Yolo Bypass could relieve flooding if, in their opinion, the Bypass is efficient as designed. Participants also believe excessive transport of water supplies causes the region's seepage problems.

- **CONDITION OF THE RIDGECUT:** Many participants believe the Knights Landing Ridgecut vegetation is overgrown and in need of immediate action.

## **SACRAMENTO MEETING OVERVIEW**

The Local Support Group meeting for the Sacramento region of the Sacramento and San Joaquin River Basins Comprehensive Study was held on November 10, 1998; it was attended by 11 people. Participants asked questions and made comments that focused on environmental issues. Additional concerns included the following:

- **STORMWATER QUALITY:** Participants commented that stormwater management and stormwater quality issues should be addressed in the Comprehensive Study.
- **EXOTIC SPECIES:** Comments and questions were asked regarding the invasion of exotic species, such as the mitten crab. This problem is specific to the region.
- **ENVIRONMENTAL IMPACTS:** Some participants believe that basic guidelines for environmental impacts should be developed as a part of the study process.
- **PROTECTION VS. MITIGATION:** There were questions and concerns regarding inconsistencies between levels of protection and mitigation.
- **HYDRAULIC MITIGATION:** Some participants believe that significant hydraulic impacts must be quantified.
- **AGENCY COORDINATION:** Participants suggested that the Corps of Engineers and the Pacific Gas & Electric dam operators must communicate and coordinate flood management (especially during flooding).
- **SYSTEMWIDE APPROACH:** Participants stated that flood storage must be evaluated from a systemwide approach.

## **KNIGHTS LANDING MEETING OVERVIEW**

The Local Support Group meeting for the Knights Landing area of the Sacramento and San Joaquin River Basins Comprehensive Study was held on November 10, 1998; it was attended by 12 people. Participants voiced concerns regarding issues related to the operation of upstream reservoirs. Additional concerns included the following:

- **PERMIT PROBLEMS:** Some participants stated that environmental issues are causing

lengthy delays for local projects. One example provided is the Mid-Valley Reconstruction Project, which had led to time-consuming approval processes of many other projects and has caused delays in construction.

- **LEVEE MAINTENANCE:** Participants believe that protected species (garter snakes) and overgrown brush (cottonwood trees) may be preventing the maintenance and repair of levees.
- **MAINTENANCE:** It was stated that California has a very efficient flood management system but, without fiscal resources of the local districts, there are no entities to operate and maintain the system due to the high costs of maintenance. Another point was that water should be controlled at the source. This situation would prevent many of the issues that arise downstream.
- **SEDIMENTATION/WEIR DEBRIS:** Several participants stated that at the Fremont Weir sand has accumulated. However, removing sand from one area and depositing it in another area could create problems for the Sacramento and Feather Rivers. The lower reaches of the Sacramento River receive sediment from the Feather River, thereby preventing a variety of recreational activities, such as large cruisers coming up the Sacramento as they have in the past. Also, since debris is not removed from the weirs, there is a problem with high water in the main river.
- **CURRENT OPERATIONS:** Some participants thought that a contributing factor to the area's problems is that the Ridgecut system was designed (pre Shasta Dam) for floodwaters that increased and receded quickly, without the control of reservoirs.
- **PRIORITIES OF OPERATION:** There were concerns raised regarding the operation of dams. Concerns were expressed that operation for recreation, fish and wildlife has been given higher priority than flood management.
- **LIABILITY:** For a period of time, after the floods of 1986, reclamation districts could not get liability insurance to cover flood damage to levee systems. Although they are now able to get the insurance, it is very possible that insurance companies could choose not to cover levee costs during a poor economic period. If the levees are not covered by insurance, the State could become responsible by default.
- **DISPROPORTIONATE PROTECTION:** Participants believe that funding for levee improvements is prioritized for urban areas.

## **WILLOWS MEETING OVERVIEW**

The Local Support Group meeting for the Willows area of the Sacramento and San Joaquin River Basins Comprehensive Study support group meeting was held on November 16, 1998; it was attended by 17 people. Participants voiced questions and concerns about flood management and ecosystem restoration. Other concerns included the following:

- **DAMAGES:** Participants were concerned about damages from previous floods.
- **MODELING:** Participants stated that local residents who are familiar with the flood management system would like to help build the H&H model that is being developed by the Comprehensive Study Team.
- **CONFLICTS BETWEEN AGENCIES:** Participants voiced concerns regarding which agency has the governing authority to settle conflicts between agencies.
- **OPERATION:** Some participants want the reservoir operational parameters to be examined.
- **LEVEE PROTECTION:** There were concerns that not all levees provide an adequate level of protection.
- **MODELING:** There were concerns that the H&H model will not be finished in time to prevent flooding.
- **MULTIPLE-AGENCY:** Some participants commented that the varying roles of the responsible agencies might create a problem.

## **RED BLUFF MEETING OVERVIEW**

The Local Support Group meeting for the Red Bluff area of the Sacramento and San Joaquin River Basins Comprehensive Study was held on November 16, 1998; it was attended by 14 people. Participants voiced concerns regarding the need for better flood management. Other concerns included the following:

- **ACCOUNTABILITY:** Participants raised questions regarding which agency will be ultimately responsible for implementation of the Comprehensive Study Master Plans.
- **STRATEGY WITH PRIORITIES:** Comments were raised regarding the projects to be recommended by the Comprehensive Study Team and the need for equitable prioritization.

- REOPERATION: Participants commented on the operation of Shasta Dam and the amount and length of time water is stored.
- COST-SHARING: Participants believed that the project costs should be shared among all parties which benefit from the projects.
- MULTIPLE AGENCIES: Some participants commented on the difficulty local agencies have in working through the institutional layers created by agencies responsible for flood management.
- ENVIRONMENTAL RESTORATION: Some participants stated that restoring riparian habitat in the region is a high priority.
- THIRD-PARTY IMPACTS: Participants stated that agencies should be aware of third-party impacts caused by levees and re-vegetation areas.
- IDENTIFICATION OF LEVEES AT RISK: Participants noted that there are levees at risk, because of erosion, near Tehama.

## **CHICO MEETING OVERVIEW**

The Local Support Group meeting for the Chico area of the Sacramento and San Joaquin River Basins Comprehensive Study was held on December 1, 1998; it was attended by 23 people. Participants voiced questions and concerns that were environmental in nature. Other concerns included the following:

- PROJECT COORDINATION: Participants wanted to know how the Comprehensive Study Team will integrate the Comprehensive Study and the watershed planning work of other agencies.
- MULTIPLE AGENCIES: Participants believed that there are regulatory processes within the agencies involved with the Comprehensive Study which work at odds with each other. If conflicts do arise, it is essential to have a method for developing a solution.
- SUBSURFACE MODELING: Participants asked questions regarding data such as groundwater, surface flows, drainage and land use. These data are being evaluated by the Comprehensive Study Team, and participants want subsurface drainage also considered in the modeling effort.
- MODELING ASSUMPTIONS: There were questions and comments regarding data collection and the inclusion of certain areas and information in the modeling effort. Also

of concern was the ability to allow for information to be added to the model.

- **OFF-STREAM STORAGE:** Participants asked the Study Team to include potential off-stream storage sites in the study.
- **THIRD-PARTY IMPACTS:** Comments were raised regarding third-party impacts to landowners (seepage, etc.) adjacent to property flooded by the resource agencies for wildlife refuges, one example was RX Ranch. There should be accountability for such problems.

## **ENVIRONMENTAL WATER CAUCUS MEETING OVERVIEW**

The Sacramento and San Joaquin River Basins Comprehensive Study meeting for the Environmental Water Caucus was held on February 4, 1999. Seven people attended this meeting. Concerns of the Caucus included the following:

- **FOCUS OF COMPREHENSIVE STUDY:** Some participants asked questions regarding the focus of the Comprehensive Study and how the study will address flood management, ecosystem restoration and water supply conflicts.
- **DATA COLLECTION PROCEDURES:** Members of the group asked questions and offered suggestions regarding the Comprehensive Study Team's data collection procedures.
- **NATURAL PROCESSES:** Participants provided comments regarding the environmental benefits of natural flooding events.
- **MODELING EFFORTS:** Participants informed the Comprehensive Study Team that they believe the modeling effort should be simple and flexible enough to encourage participation in its development.
- **FLOODPLAIN DEVELOPMENT:** Some participants questioned how the Comprehensive Study would affect floodplain development and construction
- **SPIN-OFF PROJECTS:** Participants asked the Study Team about agency participation and approval processes for spin-off projects.